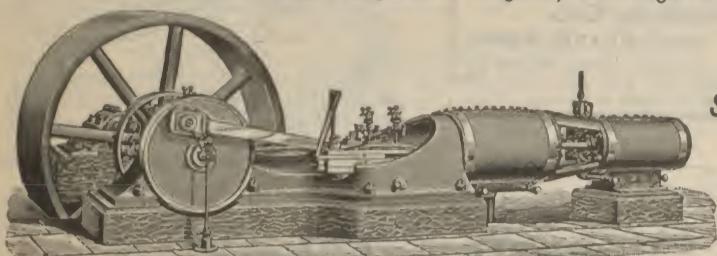


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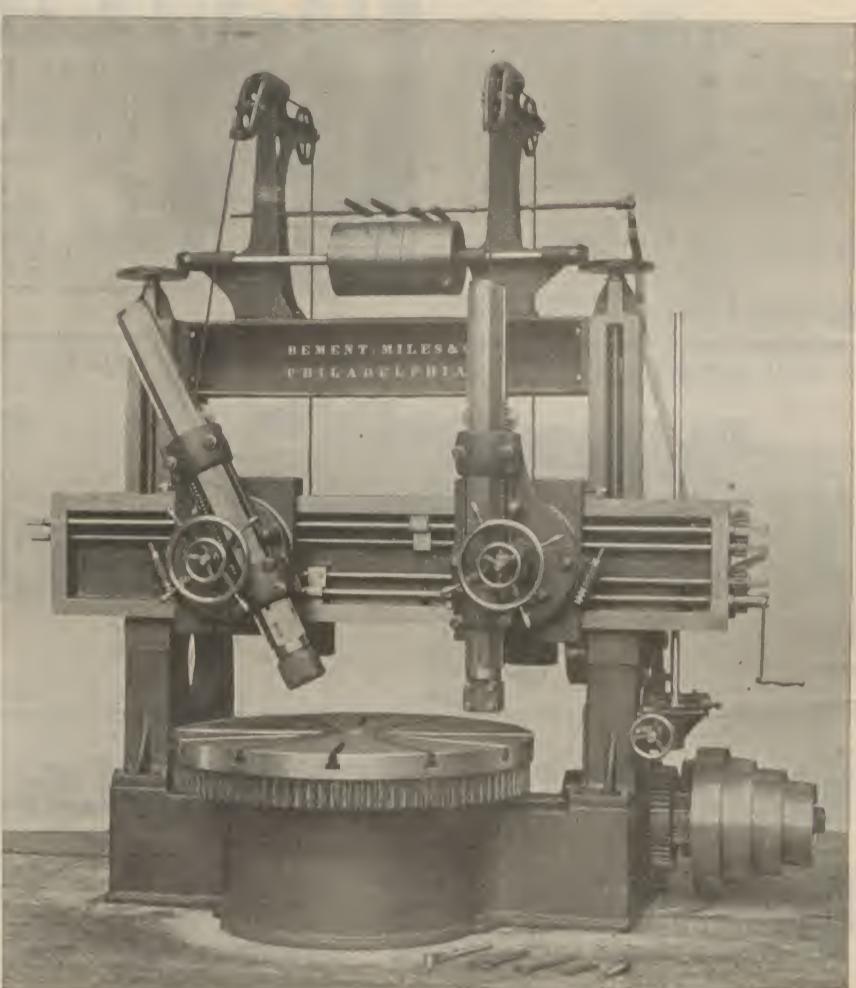
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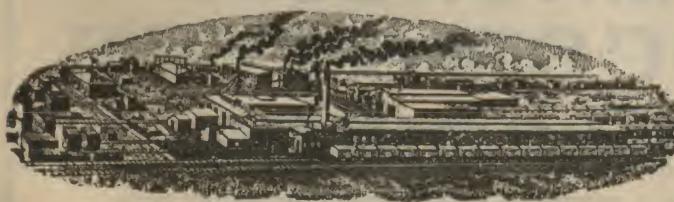
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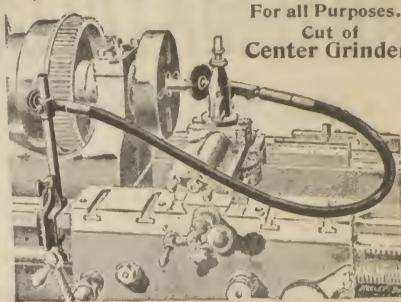
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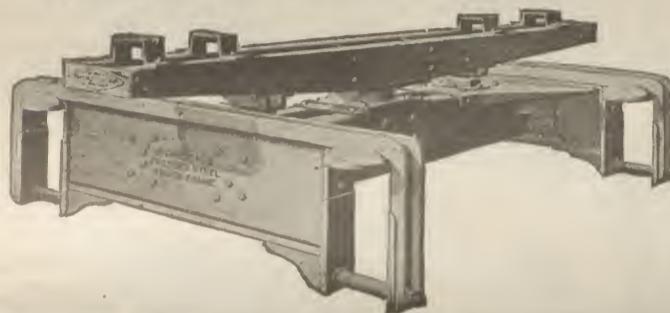
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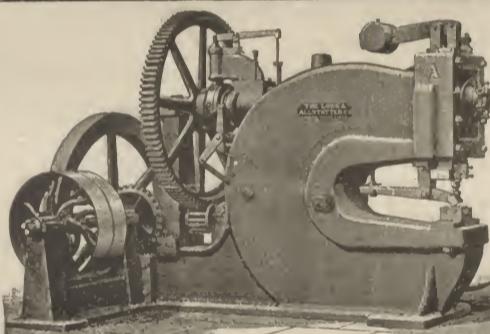
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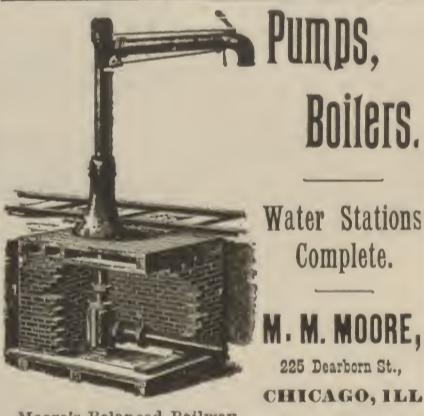
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R THE RAILWAY REVIEW

XXXVI.

APRIL 18, 1896.

No. 16.

A MOVING MOUNTAIN.—In the neighborhood of Nismes, France, a curious phenomenon has been noted in the mountain of Puy du Gouffre. This enormous mass, about 10,000,000 cubic yards, began to slide out of its position a few weeks ago, disturbing the local mines, railways, and other objects which came in its way to a considerable extent. The cause of this curious phenomenon is not yet exactly known, though the damage is in evidence in every direction around. The water pipes of the Grand Combe have been broken and it was seriously feared that an inundation of the mines near the spot would be the result. A factory and other buildings which derived their water supplies from the mountain have been suddenly deprived of this necessity and have been obliged to close their doors. Three hundred men are now occupied in constructing a loop line to take the place of the railway which has been broken up, the connection between Alais and Paris having been severed by this moving mass. Travelers at present have to alight and walk a distance of half a mile before they can continue their journey.

SWEDISH METHOD FOR PRESERVING TELEGRAPH POLES.—Sweden has discovered a very simple, effective and cheap method of preserving wood from decay in the telegraph posts of that country. A large square tank, having a capacity of some 200 gals., is supported at a height of 20 ft. above the ground by means of a skeleton tower of wood. From the bottom of the tank to within 30 in. of the ground a pipe drops. It is then connected with a cluster of flexible branches which end in a cap having an orifice in the center. Each cap is clamped so that no liquid can escape except by passing into the wood. The poles are arranged parallel to one another, sloping downwards, and troughs run under the ends to catch drippings. When all is ready a solution of sulphate of copper previously prepared in the tank flows through the pipes. The pressure produced by the fall is sufficient to drive the solution gradually, right through the poles from end to end. After drying, the fiber of the wood remains permeated with this preserving chemical.

METHOD OF DETERMINING CARBON IN STEEL.—In a recent number of Dingler's Polytechnischer Journal a novel method of determining carbon in steel, due to Mr. Peipers, is described. The method is similar in principle to the assay by touch in use for gold. A series of six bars of known carbon content are prepared, each successive one of which contains about .2 per cent of carbon more than its predecessor. These bars form the touch needles, whilst the touchstone is represented by a slab of unglazed porcelain. To make the test, the specimen to be examined is rubbed on the porcelain, as well as the needles, producing long black patches, which are made of equal depth of tone. The slab is then immersed in a 12½ per cent solution of copper ammonium chloride, which dissolves away the iron, leaving the carbon behind as a gray stain. The depth of this stain is proportional to the carbon in the steel. It is claimed that differences of as little as .025 to .05 per cent of carbon can be determined in this way when the conditions are favorable.

THE BALLOON EXPEDITION TO THE NORTH POLE.—Mr. Andree's plans for his balloon expedition to the north pole seem to be fairly definite and complete. He will leave Gothenburg on June 7 in the Virgo for Spitzbergen, plentifully supplied with provisions, a balloon house, and all the necessary materials for the construction of a balloon. Tromso will be reached in six days, and Spitzbergen a week afterwards. Here the balloon will be filled, and Mr. Andree, in company with Dr. Ekholm and Mr. Strinberg, expects to be ready to depart about the end of June. The balloon will carry four months' provisions in a concentrated form, and an electric cooking and heating apparatus. Mr. Andree, who is chief engineer to the Swedish bureau, has been experimenting in balloon sailing, and he now finds that he is able by means of a sail and a rope which drags over the ground, to steer within two points of the compass on either side of the wind. His plans certainly do not appear very plausible on the first glance; yet he himself is confident as to his success, and his enthusiasm has proved infectious. Most of the provisions have been presented by merchants, and several Norwegian and Swedes have contributed generously to the cost of the balloon. The King of Sweden has given \$9,000, and Mr. Alfred Nobel \$17,500.

A LASTING PAINT FOR GLASS.—A durable and effective method of painting glass is described as follows: The glass is cleaned thoroughly with acidified water and fossil meal and a solution of 10 parts of stale beer and 1½ parts of potash water glass is poured over it. After drying the glass is heated moderately and as uniformly as possible, when it is ready to receive its coat of paint, for which the following prescription is given: 100 parts (weight) of Cologne glue are allowed to soak in cold water for several hours. The water is then poured off and the glue is put into a pot and melted. While the glue is melting, 200 parts of linseed oil are heated until the temperature of both substances is about equal. As soon as no more air bubbles can be observed in the glue, the linseed oil is added gradually under continual stirring. The mixture has to be kept hot over a slow fire for an hour and stirred without interruption. For stirring a round stick is the best, as an angular one will produce bubbles. Then 200 parts of slightly heated turpentine or camphor oil are added and at last the coloring substance and 150 to 200 parts of water. All these additions have to be made slowly, while stirring must not be neglected. The paint is spread on lukewarm and is dry within six hours.

CHANGING LAKE LEVELS.—A correspondent writing to the Marine Record concerning the low water in the lakes,

calls attention to the rise of Lake Superior. In the last four years the water in this lake has raised about 2 ft. In '92 it raised about 8 in. In '93 about 7 in., and in '94 about 9 in. In '95 it about held the same level as in '94. These figures in regard to the rise of water are approximates as the interests of persons making the observations did not require the keeping of the exact record. In looking for the reason of this rise, particularly when the lakes whose level is below Superior have been gradually lowering in the above time, he has come to the conclusion that on account of the dredging that is being done at the head of the American and Canadian "Soo" canals, and the dumping of the same at the head of the rapids, the head of the "Soo" river is being gradually dammed, thus keeping the level of Lake Superior many feet higher than it should be above the lakes below. It would probably be well for those most interested to look this matter up and see if this is not a solution for a part of the low water whose level is below Superior.

AN INTERESTING EXPERIMENT WITH ROTARY MOTION.—An interesting experiment is described in *Invention* which will serve to illustrate why guns are rifled and the effect on the shot by the consequent rotary motion, can be made by any cyclist when cleaning his machine. Assuming the front wheel is detached, lay it upon the floor and, keeping the axle vertical by the hand, give the wheel a vigorous spin. The axle remains unaffected, the wheel running in the ball races. Now lift the wheel by means of the axle and put the left hand under the wheel and catch the other end of the axle. You now have a horizontally revolving wheel, and you will be astonished to find how difficult it is to turn the wheel into a vertical position as long as the spinning continues. Let this cease and you can do as you like with the wheel, but give it a vigorous spin and you will find, whatever position it was then in, it will show the perversity of a pig if you attempt to change it. In making this experiment, get a good grip, as it throws a very considerable strain on the arms and feels, indeed, as though one were struggling with some aerial wrestler. Imagine now a shot starting on its course with this rotary motion; if it meets an obstruction fairly and squarely, the forward motion will be somewhat arrested, but the boring action due to rotation will give it a terrible penetrating power. Again, suppose it strikes at a slight angle and you may think it will glance off like a stone from a smooth piece of walling. The new force, however, here comes into play, and most decidedly objects to the alteration of direction, thereby causing penetration that would be quite impossible under other circumstances. After making the above experiment, you will find you have a much increased respect for a shot fired from a rifled barrel.

LIQUID FUEL ON LOCOMOTIVES.—The use of liquid fuel has been so extended on the Great Eastern Railway (England) that a large storage plant has been erected at Stratford, England. Twenty-five locomotives are now fitted with oil burners under the Holden system, and twelve stationary boilers and three furnaces at the shops burn the same kind of fuel. The oil arrives at Stratford in bulk, old locomotive tenders being employed in transporting it at present. The storage tanks are thirteen in number, and are placed on low ground not very far from the main line. The oil flows to them by gravity. A peculiarity of the tanks is the rectangular shape. Nine of them holds 3,000 gals. each and the remaining four 2,500 gals. each.

A NEW MOLDING SAND.—A new molding sand for the production of thick castings free from blowholes has recently been introduced by Messrs. Kuhlmann Bros. of Grune, near Iserlohn, Westphalia. The molding sand is first burnt hard, then finely ground and afterwards mixed with Sal-ammoniac dissolved in water. It is claimed that in a casting made in sand prepared as above when the metal comes in contact with it a layer of steam and hydrochlorate of ammonia is formed between the metal and the sand, thus preventing the metal from running through the sand, and allowing for the production of a clean casting.

DRAINAGE SIPHON UNDER THE SEINE.—A siphon under the Seine, in Paris, is described in "*Le Genie Civil*." Its purpose is to tap the present drainage system of Paris on the left bank of the river and convey the sewage under the river and into the Assinieres main collector on the right bank. It is a tube, 5.86 ft. in inside diameter, made of four flanged plates and a filling piece at the crown, with a total length of 776 ft. and a bottom depth of 37 ft. below the mean level of the river. The soil is very favorable for tunneling; but a shield was used in advancing the tunnel and compressed air was employed for the purpose of keeping out the water. The contracting engineer is M. Berlier, who lately completed the Clichy siphon, lower down the Seine. He obtained the contract for both siphons at his own risk and under a forfeit of \$20,000 for the Clichy, and \$9,500 for the Concorde tunnel. The Clichy tunnel was 7.5 ft. in diameter and cost \$122.70 per lin. ft. complete. The work was pushed from a single shaft, 10 ft. in diameter, on the left bank. The tunnel is nearly completed; the shaft having been sunk 49 ft. deep in 47 days, and the tunnel was finished in 111 days, a mean daily advance of 7 ft. The soil penetrated was, for about half the distance calcarious strata alternating with gray marl. Beyond this point the tunnel penetrated blocks of calcarious rock containing much water between them, and this 65 ft. was the most troublesome and costly part of the line. Near the right bank of the river the roof of the tunnel came within 11.7 ft. of the bed of the river and great precautions had to be taken to avoid an inrush of water. The tube is lined with concrete to the level of the interior flanges and arrangements are made to flush the tunnel by passing through it a wooden ball, after the manner employed in cleaning other siphons in Paris. The shield used is of the usual type, advanced by hydraulic rams abutting upon the metal ring.

NEW MANUAL TRAINING SCHOOL AT MUSKEGON, MICH.—A new manual training school is to be built at Muskegon, Mich., donated to that city by C. H. Hackley, who has already given Muskegon a public library building. The new

building is to be built under the plans of Patton & Fisher Chicago, architects. It is to be used in connection with the high school, the students pursuing certain branches of study in the high school, and taking only the manual training in the new building. For this reason the plans for the training school provide for only a few class rooms at the front, the rest of the building being devoted to shops. The idea of the shop is carried out in the architecture, there being no plastering. The walls are all of brick finish on the inside and the floors of mill construction, the heavy timbers being dressed, forming both ceiling and floor. In the basement are the blacksmith and machine shops, and in the rear there is a separate building containing the engine, boiler-room and foundry. The first floor has the carpenter shop and wood-turning room. The second is entirely devoted to the girls' departments, there being a kitchen, laundry and sewing-room, with provisions for other branches of instruction. The space in the front is utilized for drawing-rooms and a large gymnasium for girls. At present only the center portion of the structure will be erected, at a cost of about \$30,000. A very complete system of heating and ventilation by the hot-air blast system will be provided.—[Iron Trade Review].

MANUFACTURE OF YARROW WATER TUBE BOILERS IN THE STATES.—According to a correspondent of the Glasgow Herald, Messrs. Cramp, of Philadelphia, have purchased the right of manufacturing the Yarrow water tube boiler in the United States, and that firm proposes to urge the government of the United States to adopt this steam generator in some of the vessels now under construction. The Chicago, he states, which was originally to have nickel-steel boilers, is now, instead, to have what is called a combination installation, consisting of multitubular boilers in one compartment and water tube boilers in another, and as this system is soon to be tried with Yarrow boilers on a warship on the continent, it is probable that the success which is promised by preliminary trials will induce similar combinations to be made, as by this means rapidity of steam raising is secured without forfeiting advantages of the tubular type, to which so many are still wedded. This system, however, will limit the steam pressure, and, after all, a high working pressure is the great desideratum at the present moment, and provides the most important argument in favor of the new tubulous boiler. In warships a much greater power is got from the higher steam pressure on practically the same weight. The correspondent in question states that it is proposed by some of the builders here to have steam pressures of 280 lb. to 360 lb. in new destroyers, which it will at once be recognized is a great step from the 155 lb. of ordinary cruiser practice. Even in the 27 knot boats the pressure was only from 210 lb. to 230 lb.

POWER TRANSMISSION BY ROPE.—In a paper on power transmission by ropes and belts, read before the French Society of Civil Engineers, Mr. V. Dubreuil states that one great advantage possessed by ropes is that cyclical variations in the speed of the driving pulley are "damped" by the ropes, so that the speed of the driven pulley is much more uniform than that of the driver. Ropes are also useful when the two lines of shafting are not perfectly parallel. The velocity of the rope should not be less than about 1,500 ft. per minute, nor more than 5,000 ft., whilst with belts a velocity of as little as 600 ft. per minute may be used, but the maximum should not exceed 4,000 ft. per minute, above which the centrifugal force prevents the proper adhesion of the belt to the pulley. For great distances between the lines of shafting, ropes should be used; though in exceptional cases they may be employed with as little as 12 ft. between shaft centers, though in general the distance should not be less than 20 ft. Spans of as much as 328 ft. have been worked by ropes with only intermediate support. Under no circumstances should the diameter of the smallest pulley be less than 30 times the diameter of the rope, and in general the pulley ratio should not be greater than four to one. Three stranded ropes of manilla, hemp, or cotton may be used. Hemp is much cheaper than cotton, and usually wears longer, but is less pliable. To facilitate estimates, the approximate weight of a rope pulley may be taken as 5½ lb. per groove for each inch of diameter, though single groove pulleys will weigh double this amount.

DEMURRAGE LEGISLATION.

The following act to promote diligence in loading, unloading and switching freight cars in the state of Ohio has been introduced in the legislature of that state:

SECTION 1. Be it enacted by the general assembly of the state of Ohio, That whenever any railroad company has established at any point in the state of Ohio a station or stations, or other place or places, with facilities for receiving and delivering freight in car loads, it shall be the duty of said railroad to extend to all shippers and receivers of freight at such stations or places, equal, prompt and reasonable service in the use of said facilities; and it shall be likewise the duty of all shippers and receivers of freight at such stations or places, in the absence of an agreement to the contrary, to unload or to load said car or cars, as the case may be, and to do so promptly and with diligence.

SEC. 2. That whenever any car or cars containing freight in carload quantities (which under the conditions of shipment must be unloaded by the consignee), shall arrive at its destination, at any railroad station or point in Ohio, it shall be the duty of the railroad company delivering said car or cars, in the absence of an agreement to the contrary, to notify the consignee by written or printed notice of such arrival, and it shall be the duty of such railroad company to place, with reasonable diligence, said car or cars at its customary point of delivery for such car or cars, so consigned.

That if, after such notice, and the placing for delivery of any car loaded and consigned as aforesaid, the consignee shall not within a period of forty-eight hours, computed from noon of the day when such delivery has been made, unload, release or give instructions for forwarding to another destination, such car or cars, such consignee shall pay such railroad company as a penalty for the detention of such car or cars, the sum of one (\$1) dollar per

car for each twenty-four hours or fraction thereof in excess of forty-eight hours, computed as above, during which such car or cars has or have been at the point of delivery and accessible to the consignee.

That if, after arrival at destination any freight in car-load lots, as above described, the railroad company shall not notify the consignee, or shall not place the car or cars as above described at their customary point of delivery, easily accessible to the consignee, for a period of more than forty-eight hours, counted from noon of the day of arrival, then said railway company shall pay to such consignee as a penalty for said delay, the sum of one (\$1) dollar per car for each twenty-four hours' delay, computed as aforesaid.

SEC. 3. That, whenever any shipper of freight in carload quantity, shall notify the proper agent of any railroad having stations, places or facilities as aforesaid, in the state of Ohio, of such shipper's desire to load for shipment over said railroad, property in carload quantity, from one consignor to one consignee, it shall be the duty of such railroad company in the absence of an agreement to the contrary, to place at its customary point of loading, convenient of access to such shipper, the car or cars so ordered within a period of forty-eight hours computed from noon of the day when such order or notification has been given to the proper agent; and if any railroad company having stations and facilities as hereinbefore described, shall not place such cars as aforesaid, and within the time aforesaid, said railroad company shall pay to such shipper for each and every twenty-four hours or fraction thereof in excess of the forty-eight hours herein provided, as a penalty for said delay, the sum of one (\$1) dollar per car.

That, if any shipper who may order such car or cars as above described, in the absence of an agreement to the contrary, shall not load the same or have it or them ready to be forwarded, within a period of forty-eight hours, computed from noon of the day of placing, said shipper shall pay to said railroad, as a penalty for the detention of such cars, the sum of one (\$1) dollar per car for each period of twenty-four hours or fraction thereof in excess

or unload when prevented from so doing by stress of weather.

SEC. 6. That the delay or delays for which the foregoing penalties are provided, shall be deemed to be of the nature of malicious or oppressive wrongs; and that all sums of money herein provided for as payable as penalties shall be due and payable when demanded; and if any railroad company or shipper or receiver of freight shall refuse or neglect to pay any such sums as may be lawfully payable under this act, the claimants may proceed to recover the same by civil action to which there shall be no defense upon its merits, other than the absolute impossibility of avoiding such delay with proper regard for the safety of life and property, and in case of a recovery of any sum under this act, the claimant shall also be entitled to recover in addition to his costs, a reasonable sum as attorney's fee; and nothing in this act contained or done thereunder, shall be construed to prevent the recovery by such claimant, either in the same or a different action of the further actual damages sustained by such delay, whether for more than forty-eight hours or less, if due to negligence.

Profiles of the Principal Mountain Railways of the World.

[From the Engineering News, April 9.]

Some years ago Mr. W. W. Evans prepared an interesting diagram of the profiles of a number of the principal steep grade and mountain railways of the world, to show their relations to the grades and summit elevations of the Peruvian railways. To this diagram the late A. M. Wellington added the profiles of the Pennsylvania Railroad, the Baltimore & Ohio Railroad, the Denver & Rio Grande Railroad, and the line which he surveyed from Vera Cruz to the City of Mexico, via Jalapa (which line has since been practically followed by the Interoceanic Railway, which now competes with the older line of the

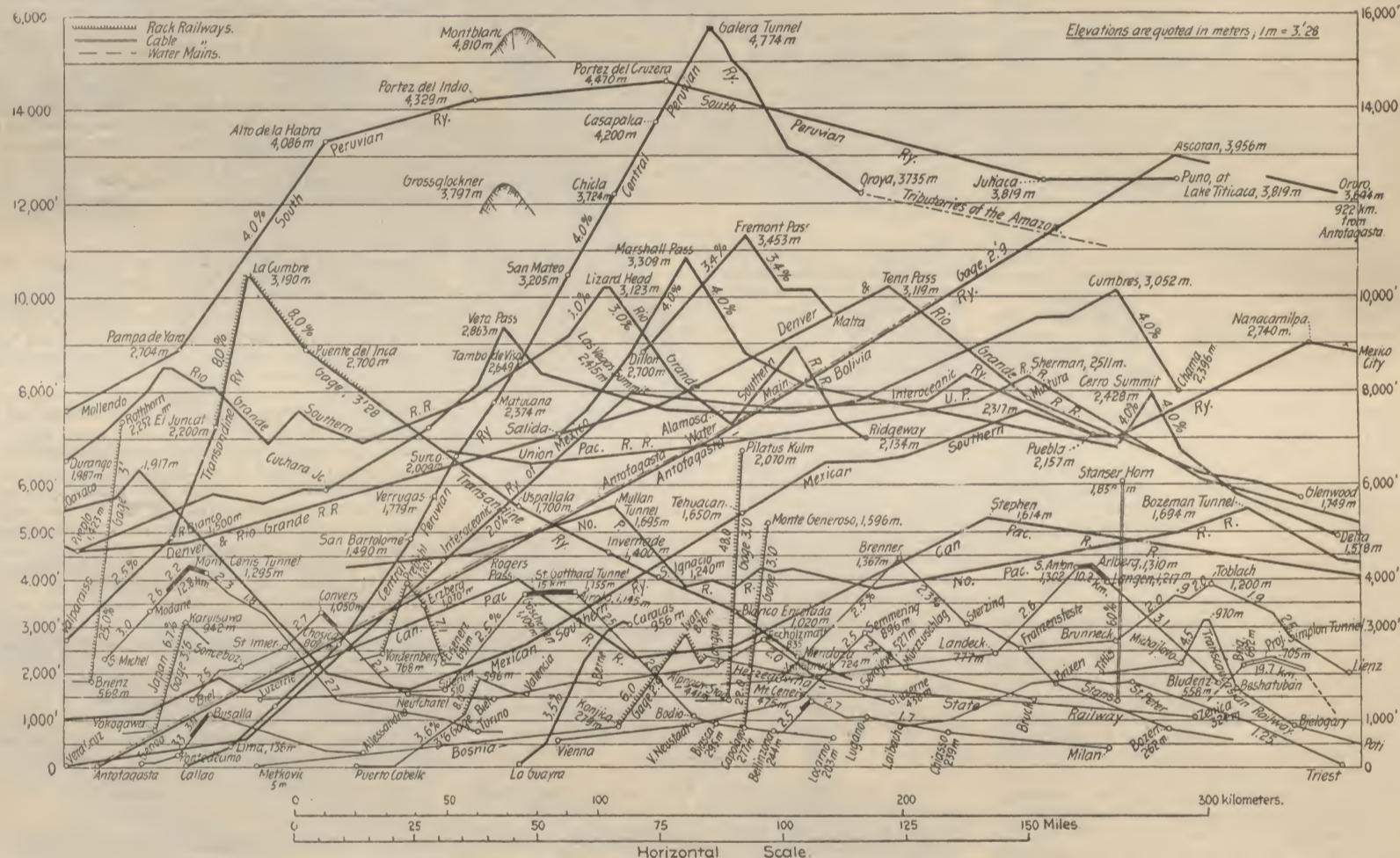
from 15,745 to 17,000 ft. above the sea, the conditions are such as to render railway construction extremely difficult.

The standard gage railway connecting Callao and Oroya, the most prominent on the diagram, has a total length of 142.6 miles, and ascends the mountain with a 4 per cent grade 99 miles long. The longest narrow gage railway shown is the Antofagasta & Bolivia Railway to Oruro, 571.6 miles long. While the "Zeitschrift" admits that the highest railways are to be found on the American continents, it consoles itself with the assertion that in length of railway tunnels at Mt. Cenis, St Gothard, the Arlberg, and in the projected Simplon tunnel, Europe is still ahead of the rest of the world.

In this diagram rack and cable railways are indicated by proper distinguishing symbols; and in this connection it may be noted that the scale used makes a 60 per cent grade appear very nearly vertical. The water main shown parallel to the Antofagasta Ry. is 173.6 miles long, and it supplies the city of Antofagasta and the stations along the line of the railway.

QUALIFICATIONS OF A SUPERINTENDENT OF AIR BRAKES.

The remarkably rapid introduction of continuous brakes in this country together with the fact that this apparatus requires the attention of experts or specialists in the subject who must devote considerable study to the system has, on large roads, necessitated the establishment of an officer to take the responsibility, proper care of, and to take charge of the instruction of men who are to use the apparatus upon the trains. The qualifications which best fit men to fill such positions were outlined by Mr. F. B.



of forty-eight hours after such cars have been placed, as herein above described.

SEC. 4. That whenever the consignee shall have received notice of arrival, as provided in Section 2 of this act, at a point where switching service is maintained, and where it is customary for the carriers by switching service to interchange freight between each other, or to transfer freight for shippers from one point of delivery to another point of delivery on the same line or upon a different line of railroad, within prescribed limits, and upon prescribed conditions; if such consignee shall by written order instruct that such car or cars be forwarded or switched from such point of delivery to another point of delivery within prescribed limits, it shall be the duty of the railroad company promptly to perform such switching service; and if such railroad company shall not place such car or cars at such new point of delivery within forty-eight hours, such railroad company shall pay to the consignee as a penalty for such delay, the sum of one (\$1) dollar per car for each twenty-four hours or fraction thereof, in excess of forty-eight hours, consumed in switching, time to be computed from noon of the day of instruction.

That upon delivery of such property at such new destination, and upon its being placed at a point readily accessible, it shall be the duty of the owner or shipper promptly to release the same as provided in Section 2 of this act, or in default thereof, pays a penalty for delay, in the same manner as prescribed in Section 2 of this act.

Sec. 5. That in computing time as herein provided, Sundays and legal holidays shall not be reckoned against either shippers or carriers, and no consignor or consignee shall be held as being negligent by reason of failure to load

Mexican Railway between these two points). This combination set of profiles accompanied Mr. Wellington's paper on "The American Line from Vera Cruz to the City of Mexico, via Jalapa," in the transactions of the American Society of Civil Engineers, Sept., 1887, and was published in Engineering News Sept. 3, 1887, and in Mr. Wellington's well known treatise on "The Economic Theory of Railway Location." In a recent number of the *Zeitschrift der Oesterreichischen Ingenieur und Architekten Vereine*, we find this same diagram, somewhat modified, and brought more nearly up to date, but no credit is given to, or any mention made of, the earlier publication on which the diagram is based. Nevertheless this later diagram is of some special interest in that it shows a number of recently built mountain lines, and we have therefore redrawn it and present it here-with, with the above explanation as to its history. We have shown the railways on the continents of North and South America by heavier lines than those of the railways in other parts of the world.

The journal above mentioned states that the greatest altitude reached by any standard gage railway in Europe is 4,483.7 ft. at the Brenner Pass, over the Alps; the Peruvian Central Ry., on the other hand, crosses the Andes through the Galera tunnel, at an elevation of 15,658.72 ft. above the sea. This South American tunnel lies at an elevation nearly equal to that of the summit of Mont Blanc; and while the snow line on the Andes lies still higher, varying

Farmer in a paper recently read by him before the Northwest Railway Club from which the following is taken:

As the first object of the appointment was almost invariably to give instruction, the titles "Air Brake Instructor" and "Air Brake Inspector," some prefixing the latter with "General," were frequently applied to the party filling the position. However, some few roads, two such being in this vicinity, early recognized the future responsibilities of the position, and gave to it the title of "Superintendent of Air Brakes." As the duties should comprehend a supervision over every detail connected with the air brake, it will be readily seen that nothing is assumed in the name that is not compassed in the work. There is yet another consideration in the selection of an official title. While the remuneration accompanying a position is certainly of first importance, there is a natural and commendable pride inherent in every man, and which is gratified in the public recognition of his worth that is conveyed by one correctly used. As the existence of such a feeling is plainly evident, even among the highest officials, it must be no less so with the man who by striving has raised himself one step above the multitude. There is an incentive in it to justify the application by greater efforts, and for these reasons it is to be hoped that it will become universal. It is the purpose of this paper to show the need of such an official; necessary qualifications; duties; authority which should go with the position; and to outline, in part, the manner in which it is deemed best for the work to be carried on.

The air brake superintendent is needed—1. Because there is such a large amount of money already invested in air brakes, and so much more will be added in the next

two years, that the delegating of parties to give especial attention to the vast interests involved is demanded as a judicious business measure.

2. Because in the application of new equipment and the repairs to old there is always unnecessary expense and inferior results unless some one thoroughly understanding the brake is in charge.

3. Because the operation, locating of defects, reporting or repairing same all devolve on men, the majority of whom are unable to perform the duties either safely, economically or expeditiously, thus endangering life and property, without competent instruction.

4. Because, while distinctly a sub-department of the mechanical, it is yet so intimately connected with the transportation as to render it advisable to have some one qualified person to supervise and harmonize the interests of both.

5. Because new features in application, operation and repairs will constantly be evolved, and it is necessary to have some one familiar with every phase of the brake question, who can distinguish the good from the bad, that one may be made the general practice and the other discontinued.

Recognition of this need is furnished by higher officials in all papers on air brake subjects read by them before railway associations and clubs, and the discussions following. The most recent of these is the able one presented before the Western Railway Club by Mr. A. M. Waitt, general M. C. B., L. S. & M. S. Ry. In reading this and the following discussion one is continually impressed with the importance of the air brake and the various manners in which unnecessary and heavy expense can be incurred. In fact, had the paper been written for the purpose of demonstrating the need of a competent man to give especial attention to the air brake department, more cogent reasons could scarcely have been advanced. In the discussion of this paper, two speakers directly recognized this feature, as will be seen from the following quotations:

Mr. G. W. Rhodes—"The attention called to the need of looking after new equipment in the application of brakes is timely."

Mr. D. L. Barnes—"The valuable lesson from Mr. Waitt's paper teaches that air brakes must receive intelligent care."

It is not to be supposed that gentlemen filling the responsible positions of superintendent of motive power or master car builder can personally make tests and pursue road investigations from which to draw their conclusions; nor if reliable results are to be had, can they depend on anyone to do this but such as are specially in this branch and thoroughly familiar with its every detail.

The brake losses that are continually taking place through lack of an efficient head to this department are—1., incorrect application and repairs necessitating change and causing continual loss until same is made; 2., incorrect use by train and enginemen causing unnecessary damage to lading and equipment.

As an example of the first the following errors are cited: Though now almost obsolete, a few years ago the practice was quite common of connecting the air pump discharge pipe to the one from main reservoir to brake valve, the object being to save a few feet of pipe and a reservoir connection. The results were: Gage soon worn out from vibrating at each stroke of pump; dirt and moisture passing through the pump was, instead of being deposited in the main reservoir, carried back into the train, causing engineer's and triple valves to clog up and wear rapidly; hose to disintegrate and burst, and, by water collecting in the train pipe, triple valve and auxiliary reservoir render the brake less efficient in summer and cause failures in freezing weather. The writer observed a case a few years ago where a modern engine came so equipped from the locomotive works, and, though the Westinghouse Air Brake Company had sent out a pamphlet showing the right and wrong way to make connections referred to, and calling attention to the dangers of the latter, there being no one to give especial attention to the brakes or instruct men, the matter went unnoticed until a wreck occurred in which three engines were heavily damaged. The train, which was all air braked, ran away down a heavy grade because the rotary valve was so badly cut that brakes released as soon as applied. Even then, had the engineer been instructed on the brake previously, he would have known how to thoroughly recharge the train and by use of the emergency avoid the wreck, as the conditions were especially favorable for such a mode of procedure.

On another road one inspector removed during a winter forty cut cocks which had frozen and burst, and due to the same cause as just mentioned. This, too, on a short road having heavy grades, where every air brake car was needed.

Other causes are: Too high and too low leverage, causing wheel sliding and reducing the efficiency of the brake; weak rigging resulting in loss by breakage, and waste of power from shoes dragging, or too long piston travel; brake so erected as to be inaccessible for cleaning and repairs; train pipe insecurely fastened, quickly developing leaks; engineer's valve too close to boiler or unhandy for operating; gage so placed that it cannot be readily seen; wrong and insufficient reports of desired repairs, causing loss of time by machinist; improperly made repairs; new material used where old is yet serviceable, and old retained where worn out.

Time will not be consumed in enumerating the various ways in which detriment results from brake handling; suffice it to say that it exists, and that much of it and many of the errors noted, as well as numberless others, are due to the lack of a competent man to supervise this department alone.

Besides the losses mentioned there are others of a different character possible. By the use of the brake it is expected that better time may be made; accidents avoided or reduced in severity; danger decreased to employees in train service and to the general public; less stock will be killed; and fewer wheels slid, cracked or broken by the brake power. This is never fully realized, however, except with the brake at its highest efficiency, and to suppose this is possible to attain and maintain through the heads of the various departments having to do with it, and each acting as seems to him best, is to exhibit a lamentable lack of appreciation regarding the magnitude of the subject.

We find, as a rule, that the men placed in charge of the air brake department have formerly been either engineers or machinists. In filling this position some have thought it better to choose from among the engineers because of their train service experience, and the prestige this gives with men in that department. However an intimate acquaintance with many railroad air brake men, some of whom were formerly engineers and other machinists, justifies the assertion that success or failure, so far as the man himself is responsible for, depends less on the character of his former occupation, so long as it had been in the mechanical line, than on the amount of intelligence, good judgment, tact and perseverance he possesses. No matter what his previous calling, he will have much to learn and many obstacles to overcome. Therefore, in the selection of a man for this position these should be the ruling considerations.

One of the most necessary requirements is tact, for the duties will bring him into contact with officials and their subordinates in the transportation, car and locomotive departments. In fact, there is no other mechanical device in use on railroads that so intimately concerns all the departments enumerated as does the air brake. Hence, with such varying degrees of mechanical knowledge, appreciation of the needs of others and desires frequently conflicting, harmony, so essential to success, is often difficult to maintain. Then, there are such other stumbling blocks as petty jealousies, over-sensitiveness, egotism and skepticism, over which he must not trip. There are many men well posted on the air brake who are totally unfit to fill the position because they lack in tact or are without that balance wheel—good judgment.

His education should be such as will enable him to write a clear, concise letter, for superior officers have not the time to study hieroglyphics or figure out what is meant by frequent obscure sentences. Also, he should at least be able to perform simple calculations.

The duties of the position should be to superintend—used in the full meaning of the word—every detail pertaining to the brake. This

should embrace the outlining of instruction to be given to road and shop men regarding operation, equipping and repairs; examination for employees and those seeking employment whose duties are connected with brake in any manner; approval of all brake designs; and the issuing of all air brake circulars or bulletins.

Knowledge is power, but power is authority. How inconsistent and unjust it would be to hold a person responsible for certain results and then not permit him to fashion them. Yet, to place one in charge of a department without authority to govern it is nothing less. Knowledge that authority is possessed, even though unexercised, and it should never be made unduly or unpleasantly prominent, begets respect. In fact, the absence of it indicates a lack of confidence in an official by the appointing power, and instills, even in the fair minded man, a similar doubt while with the perverse disposition it is an invitation to rebellion too tempting to be passed by.

In a selection of a superintendent of air brakes a man should be chosen in whom authority can be vested without fear of its abuse. While no important action should be taken without the sanction of the general superintendent, mechanical superintendent, or, when an independent department, the M. C. B., depending upon which it affects, he should not be hampered in minor details. All brake matters should be passed upon and instructions issued by him, subject only to the proper one or ones of the officials mentioned.

Railroad Revenues.

The following extract from the remarks of President Perkins in the forty-second annual report of the Chicago, Burlington & Quincy Railroad, is both pertinent and suggestive:

The year 1895, like 1894, has been a depressing one, and the company's income was somewhat less than the 4 per cent divided on its capital stock—a very small return, considering all the circumstances.

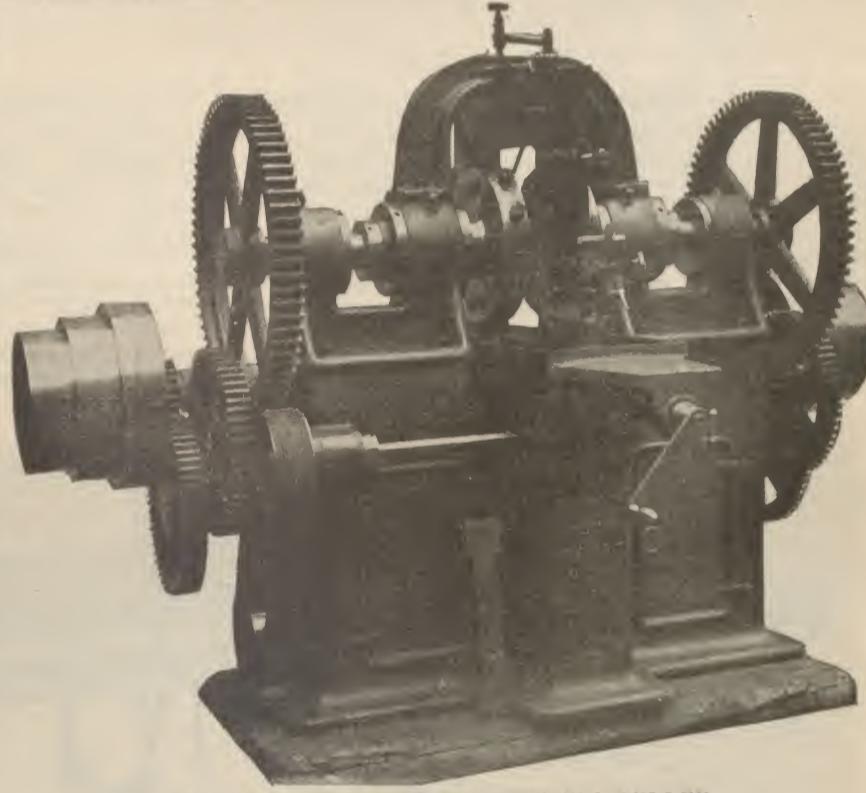
Because 5 or 6 per cent is now regarded as a fair rate of interest on money loaned, it is sometimes assumed that it is a fair profit on capital invested in business. But this is not at all true. Money loaned on good security is one thing; and money used in enterprises involving risk is a very different thing. If persons who take business risks never received more than what would be considered a fair return on safe loans, nobody would ever take such risks in building railroads, or in any thing else. To leave this out of sight, and so legislate that the owners of railroads, who take the risk and often lose everything, shall not, when successful, receive more profit than a fair return on good security, is a policy which can only result in retarding and crippling the means of transportation, and eventually forcing the public to provide such means by taxation, with a long train of evils as inevitable as they are obvious. Railroads necessarily must take the risk of crop failures and business depression; and it is both unjust and unwise to load them down, in addition, with excessive taxation and arbitrary rate regulation, while the prices of things they buy, and the wages they pay, are left to the natural law of demand and supply. Nor is it only the owners of the railroads who are interested in their earning power. During the year 1895, we paid, in wages, and for

materials (the cost of which is mostly in wages paid to somebody in this country), to operate the roads embraced in the Chicago, Burlington & Quincy system, over \$19,000,000. So the occupations and industries of communities are affected—and often largely affected—by the earning power and paying power of the railroads which serve them. It is quite as desirable that railroads should be successful as it is that business of any kind should succeed, and a very great mistake to suppose that statutes which add to the hazard and subtract from the profits of a great branch of business like that of transportation, can benefit the community at large.

THE RIEHLE STANDARD DOUBLE HEAD SPECIMEN MILLING MACHINE.

The accompanying illustration was made from a photograph of the Riehle double head milling machine which was designed for the rapid milling of flat test pieces, and will mill both sides of pieces 32 $\frac{1}{2}$ in. thick at one setting. Each cutter head is fitted with twelve tools and is driven independently in the ratio of 1 to 50. The spindles have a longitudinal adjustment of 2 in. and run in bronze boxes provided with convenient means of compensation for wear. The driving cones have three steps for 3 $\frac{1}{2}$ in. belts, and are geared to give a cutting speed of 14, 19 and 24 ft. per minute. The table, or specimen holder, has a lateral movement of 24 in., and will take in specimens up to 19 in. in length and from $\frac{1}{4}$ to 4 in. in width. It is provided with automatic feed of nine changes, varying from 0.25 to 0.75 in. advance per minute.

The machine is furnished with pump and settlin-



RIEHLÉ DOUBLE HEAD SPECIMEN MILLER.

tank, and is arranged with suitable channels and strainers for maintaining a continuous oil or water supply; also with tool grinding attachments for resharpening the tools without removal from the chuck.

The dimensions are as follows: Extreme height, 4 ft. 10 in.; extreme width, 4 ft. 5 in.; extreme length, 6 ft. 10 in.; weight 4,500 lbs. The shipping weight is 5,200 lbs.

Outline of Government Management of Railways.

An arrangement has at length been effected with respect to the management of the Victorian railways, which for some time past have been under the direct control of the government, with the result of general inefficiency and waste. A general manager is to be appointed at a maximum salary of 3,500*l.* per annum, who is to be assisted by an advisory board, consisting of the heads of the different departments, whose advice, however, he will not be bound to accept. Political influence is to be abolished, and the power of the minister of railways minimized.

A HEAVY LOAD FOR A FLAT CAR.

The steel car built by Pennock Brothers, from which the illustrations were taken, which appeared in the RAILWAY REVIEW of November 23, 1895, in connection with a description of the construction and design of the car, has been in daily use in yard service at the Edgar Thompson Steel Works of the Carnegie Steel Company, Limited, for the past nine months. It has been used for transporting pig metal, scrap and heavy material from one department to another, and is stated by the users to have given entire satisfaction. It has been found so convenient for use about the works that it has not been allowed to get into outside traffic. The loads to which it has been subjected

would have proven disastrous to an ordinary car, and an instance of the work which it is doing is of interest as showing the advantage of steel in car construction.

A skull from one of the furnaces weighing about 50 tons was recently loaded upon one end of this car, and in order to make it clear the side of the casting house it also was placed upon one side of the car, which brought the entire weight concentrated in one corner. The car body withstood the strain perfectly and, except that one of the cast iron side bearings broke there was no damage done by the load. In placing the car for unloading, a rail broke which caused the car to drop off the track and even that shock did no more damage than to break one of the yokes of the trucks which pass over the boxes. The

It is a pleasure to chronicle a case of putting 100,000 lbs. of concentrated load upon one corner of a 60,000 lbs. capacity car where practically all of the load came upon one truck and a majority of it on one side of that, without serious damage to either car or truck. The axles of this car are M. C. B. standard, and are made of nickel steel. The car weighs nearly 3,100 lbs. less than the standard flat car of the same nominal capacity on the Pennsylvania Railroad.

THE ELECTRO-PNEUMATIC INTERLOCKING PLANT AT GRAND AVENUE, ST. LOUIS.

One of the most interesting applications of electro-pneumatic interlocking apparatus yet constructed was put into service at St. Louis, Mo., Sunday,

wooden casing at the back of the machine was removed to show the construction and the arrangement of the indication attachments. The two last mentioned illustrations were taken from photographs. Fig. 4 shows the complete dog sheet for the plant. This gives an excellent idea of the complexity of the locking and to those familiar with the construction of these machines it also conveys an adequate idea of the amount of simplification of the construction of the electric features of the apparatus which has been made possible through the application of the standard machine locking principle to the electro-pneumatic apparatus.

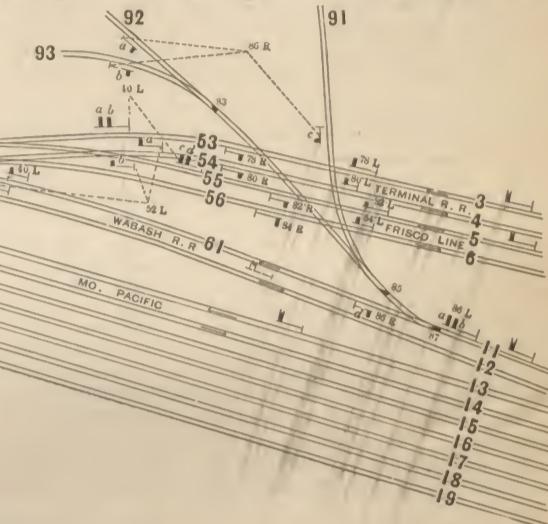
For the benefit of those interested in the method of locking, the following locking of lever No. 28 when pushed to the right is here given, in which



ELECTRIC PNEUMATIC INTERLOCKING PLANT, GRAND AVENUE, ST. LOUIS.—FIG. 1—PLAN OF TRACKS AND SIGNALS.

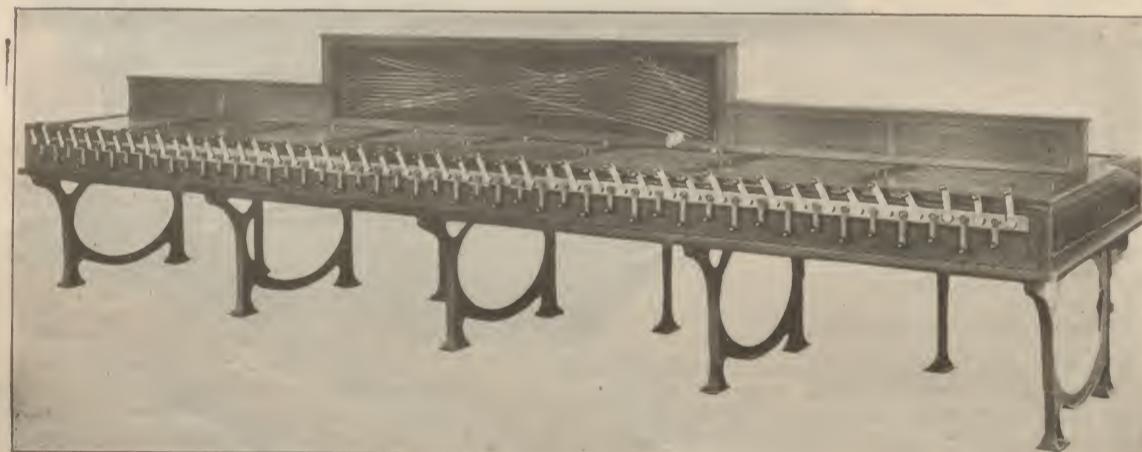
total cost of the repairs, including labor, was \$10, and the men using it expressed themselves as highly pleased with the performance. This test upon the Fox truck is also worthy of note and is evidence of the remarkable strength of this design. The car has been in service nine months as stated and this is the first time that any repairs have been needed to either the car body or trucks. The design is proportioned so as to keep the maximum stresses down to two-fifths of the elastic limit of the material with the loading for which the car was intended, 60,000 lbs.

March 15, of this year, as has already been stated in these columns. Through the courtesy of the Union Switch & Signal Co., who installed this plant, we are enabled to illustrate and describe it. Fig. 1 presents a plan of the tracks with the names of the roads concerned indicated and showing the relative locations of the Wabash and Missouri Pacific tracks with reference to the crossing by the lines of the St. Louis & San Francisco. Fig. 2 gives an idea of the appearance of the machine taken from the front. The rear view is shown in Fig. 3, in which the



the numbers in parenthesis indicate levers locked in the reversed position:

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ELECTRIC PNEUMATIC MACHINE—FIG. 2.—FRONT VIEW.

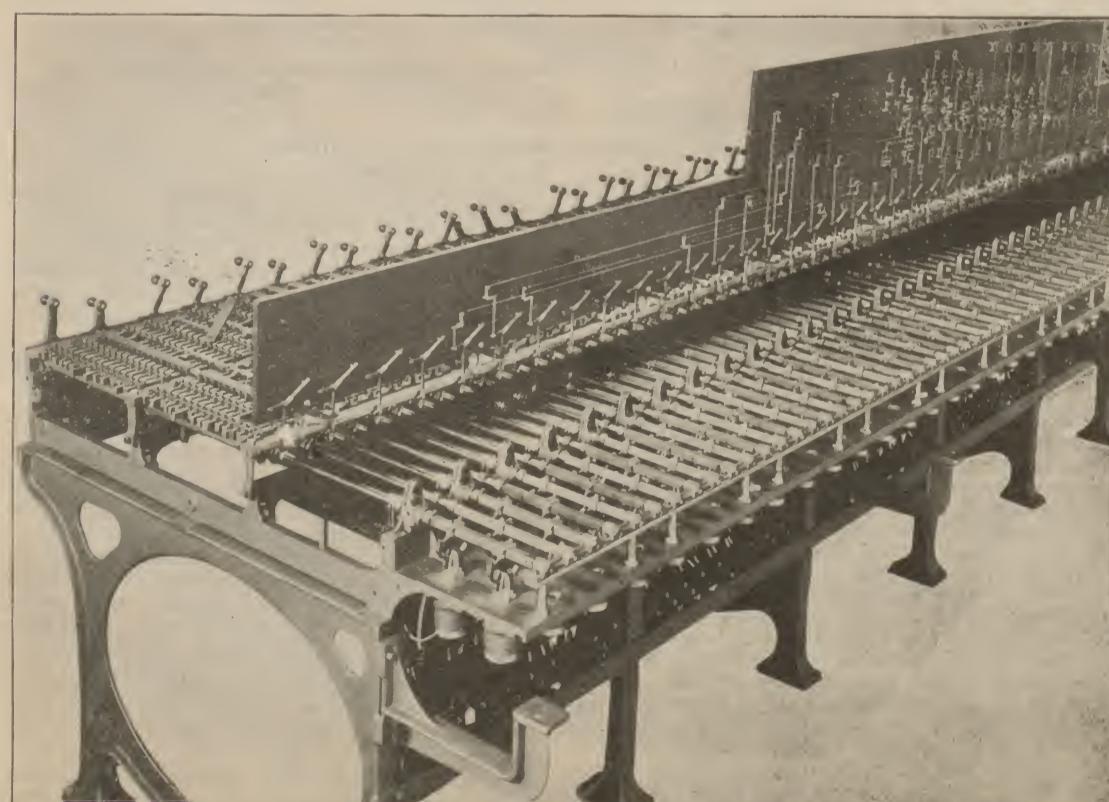


FIG. 3—REAR VIEW SHOWING INDICATION AND MODEL MECHANISM

The machine at this crossing is the latest design and was arranged in connection with the plan of tracks which was prepared especially with a view of rendering the plant easily operated and to reduce the delays to trains to a minimum. The layout of the tracks was the result of an agreement between

Mr. W. B. Doddrige, general manager, and Mr. J. W. Way, chief engineer of the Missouri Pacific Railway; Mr. C. I. Brown, chief engineer of the St. Louis & San Francisco line; and Mr. W. S. Lincoln, chief engineer of the Wabash Railroad. In the transactions Mr. J. Ramsay, Jr., represented the

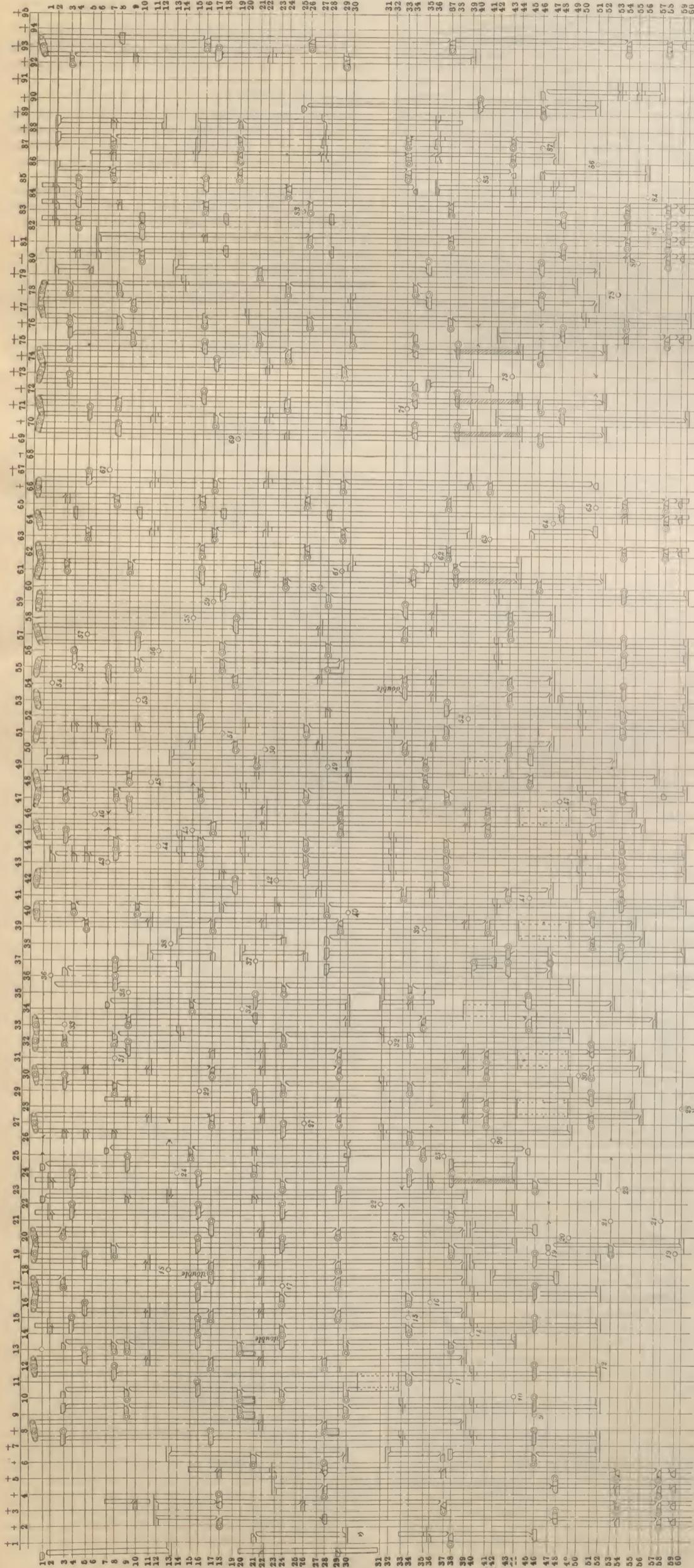
St. Louis terminal people. It is necessary only to refer to the excellent plan of the tracks in order to see that the plant is an ideal one for interlocking purposes. The designers deserve great credit for the arrangement which was finally decided upon.

The machine has 95 switch and signal levers combined but up to the present time only 69 of these are actual working levers. There are 12 spare switch levers and 14 spare signal levers whereby a considerable extension of the plant may be made when necessary. In the old practice the top row was always used for switch levers, and the lower row for signals. The new machine, however, is so arranged that certain switches and signals might be arranged in groups when necessary in which both the upper and the lower levers can be used for either purpose. This is found to be a great advantage as by it the size of the machine can be reduced for the reason that nearly always there are more spare signal levers than switch levers, and with the new arrangement the lower row can be utilized as switch levers and in consequence the length of the machine may be reduced, which in some cases may be advantageous.

The pneumatic machine has gone through a series of improvements and has now attained a condition which is thought to be likely to be permanent, and for this reason the machine described is provided with hardened steel bearings and wearing parts whereby its life will be increased over that of any of the older ones. The machine has a large number of improvements which will be readily understood from an examination of Figs. 2 and 3, by those who are familiar with the construction formerly used. It will be noticed that the locking is the miniature, that is, half size standard locking, similar in construction to that employed upon the full size mechanical interlocking machines, and the devices for attaining the number of locks necessary for some of the levers will be understood from examination of the dog sheet in Fig. 4. This dog sheet is as complicated as any installed up to this time in this country, and is especially complex on account of the construction and arrangement of tracks. The locking, it should be stated, is only effected by the signals except in the cases of crossings, there being no locking between switches elsewhere. The machine is capable of giving 520 different routes which is something unusual not only in this country but also in Europe. The plan of track shows the final arrangement of signaling, but when the machine was put into service the terminal tracks were not connected consequently the signals governing it are not erected. It is expected, however, that they will be applied in the near future.

The electric current furnished for this interlocking apparatus is generated in the lower story of the tower by two Westinghouse dynamos of 50 volts at 45 amperes each. These are two independent units driven by two five-horse power Westinghouse standard engines direct connected. Pneumatic power is used for running the engines as well as for the interlocking proper and is transmitted from the air compressors at the Terminal Association's power plant at the Union depot, a distance of over 8,000 ft., through which it is carried in a three-inch pipe. While running the engines for charging the storage batteries, as well as operating the switches in the plant, there is no perceptible drop in the pressure in the pipe, and yet there is no large storage reservoir provided at the Grand avenue end. The storage batteries used in connection with this plant are of the chloride type and have a capacity of 300 ampere hours. There are 16 accumulators in two sets of eight each which are located in a room by themselves in the lower story of the tower. These batteries are placed upon a strong wooden rack upon castors which greatly facilitates the work of renewing. The Westinghouse engines and the dynamos are mounted upon concrete foundations 5 ft. in depth, and the possibility of getting out of line is taken care of by flexible couplings between the dynamos and the engines. The engines are run at a speed of 500 revolutions per minute. The current used for charging the batteries is 25 volts and about 30 amperes. The discharge is at 16 volts. An ingenious cut out is employed which was the invention of an employee of the company, which prevents the current from the batteries from running back into the dynamos in case of the air pressure running down. This device employs the principle of a volt meter which is so arranged that if the voltage runs down owing to the shutting down of the machine or the slackening of the speed due to the air pressure becoming low, the batteries are automatically cut out and when the voltage picks up again to the desired point the current is cut into the batteries again.

The outside work of the interlocking plant itself is not different from that of other electro-pneumatic plants recently constructed. Five wires are used at each switch and the improvement in the outside work consists chiefly in the arrangement of the wires according to the plan usually followed in mechanical interlocking work. The wires are cabled to each switch and there are 60 cables leaving the tower through arches at the lower side of the wall. The experience with the electrolysis at the terminal plant has led to the protection of the entire air pipe system of the Grand avenue plant and the main air pipe leading thereto, by covering it with five-inch



sewer tile with space between the air pipe and the tile filled up solid with pitch. The main air pipe is located three feet and a half below the level of the top of rail. It is regretted that space cannot be given to more complete description of this interesting part of the work. The only change in the switch and lock movements is that the lock rods are slotted, and riveted dogs are used in place of the malleable iron fingers which were formerly bolted to the sliding bars of the movements. The boxing around the switch and lock movements is so arranged as to expose all of the bolts used in securing the timbers and each switch and lock movement is connected to the system of drainage at the plant. The main leads of wires are arranged with special reference to ease of drainage and access for testing and repairs. They are placed in trunking made of 2 x 8 in. tarred lumber in which they are supported upon shelves under which there is four inches of clear space for drainage. The cables are arranged in the order of the switches for easy reference in testing, and each is provided with an index wire to facilitate tracing.

There are 22 slip switches in this plant and no dead rails. The distant signals are located at a great distance from the tower and around curves in such a way as to prevent the possibility of satisfactorily operating them by any but electro-pneumatic apparatus. No change has been made in the switch valves and it would seem that none is necessary, as it is stated that with 82 valves at the terminal plant there were but two failures among them in the first two months of operation. The distant signals are all equipped with the Spicer and Schreuder illuminated blades. The Wabash and "Frisco" home signals have green and red lights and the Missouri Pacific red and white. The tower is of brick of two stories, the lower story having a four-inch concrete floor. A large bay window is provided in the upper story and the building is equipped with all modern conveniences. This is a plant free from what might be called frills, and as the electrical features have been very greatly simplified and the operating devices greatly improved, this would seem to be a model plant in many respects. It is much safer than those of older construction in that it is impossible for one of the operators to "plug" the indications without assistance. There are only three track circuits on the plant and these are used for annunciators. Telephones are provided between this and the other towers, and also between the tower and various points in the yards for the use of the yard crews in communicating with the train director. The total force for operating consists of two train directors working twelve hours each, and three levermen each working eight hours. A boy is on duty during the busy hours to receive telephone calls. The maintenance is looked after by one repairman who works days and another one who is on duty nights. There are also two lamp men. There are several other interesting features which for lack of space can not be mentioned here.

ASSOCIATION OF RAILWAY AIR-BRAKE MEN.

The convention of the Association of Railway Air-Brake Men opened April 14 at 9 a. m. at the American House, Boston, Mass. The opening address was made by Prof. George F. Swain, of the Massachusetts Institute of Technology, who gave a high place to the air-brake men's work and presented interesting figures showing the comparative safety of railway travel. He showed that increased safety could be expected from more perfect apparatus for stopping trains. The brake of ten years ago was compared with that of to-day, and the equipment of freight cars with automatic brakes was shown to have resulted in economy. When all cars were equipped and men were not required to go upon the tops of cars there would be not only a saving in operation of trains in greater speeds, etc., but also a saving in the trains themselves. The great work of the members, however, was to promote the instruction of men and the better maintenance of equipment. To do this work they needed the support of their managements, required instruction cars and yard plants at terminals, and air brake cars should be ordered to the head ends of trains. Occasionally roads were quoted as ordering men not to use air on freight trains. Such orders may be taken as gentle chastisement of men who handle the brake carelessly. This would do the air brake service good ultimately, as the men would steal the use of the brakes, and in doing so would be obliged to be careful. In closing he complimented the association on the promptness with which business was handled at the convention last year, and hoped the record this year would be equally good.

The secretary's report showed that on March 31, 1896, there were 216 members and \$922.83 in the treasury, and that about \$118 had since been received, making over \$1,000 in the treasury at the time of the report. Communications were received inviting the association to attend the New England Railroad Club meeting on the evening of the 14th, also from the Fitchburg Railroad to visit the interlocking plants at the terminals in Boston; also from the N. Y., N. H. & H. Railroad to take a trip to Plymouth; also from Sherburne & Co. to visit their offices and inspect the automatic sanding apparatus for locomotives. All were accepted.

The first committee report was on "Piston Travel." The discussion centered chiefly on recommendation of 90 lbs. pressure for testing in yard plants some members contending that it could not be obtained in many plants because of low steam pressure, and that the high pressure was not needed. Others favored the recommendation. One or two members argued in favor of recommending a definite figure, such as 7 in., as the travel to which inspectors were to adjust brakes, instead of between certain limits. The next report was on slack adjusters. In the discussion the citation of a case where cars fitted with adjusters wore the shoes more rapidly than others in the same train not equipped was objected to, on the ground that the reason the shoes wore more was because the travel was kept at the right figure, and those cars had to do more than their share of braking. It was also shown that no loss of power resulted from angularity of levers when the brake rods were approximately parallel, which could only occur when they were not parallel to each other, and in properly designed foundation blocks the rods would lie so near to their normal directions for all angles of the levers as to cause no loss worth considering. The advantages of adjusters were fully brought out.

The next report was on "Topical Questions." The chairman made a number of corrections of typographical errors in the reports and explained some of the answers, but at this session no dis-

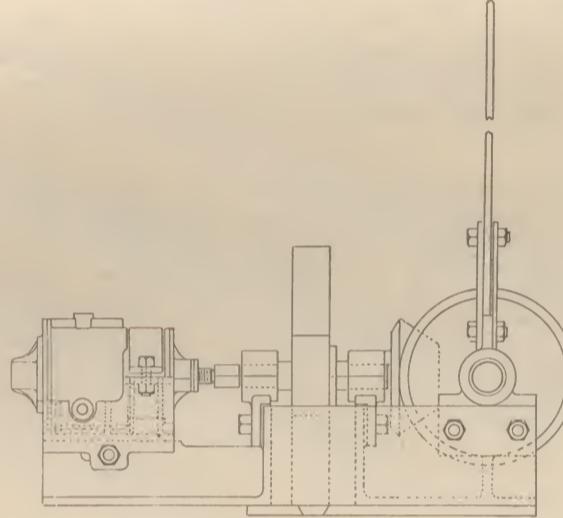
The device is light and is placed upon the floor of the shop where a few wooden blocks nailed to the floor serve to hold it in position. The attachment to the shaft of the rollers is made by means of universal joints which admit of placing the machine at any convenient point near the driving wheels. The attachment is ingenious and simple and it provides the means of dispensing with the services of a man.

TRANSPORTATION FROM AN OPERATING STANDPOINT.*

D. S. SUTHERLAND, DIV. SUPT. M. C. R. R.

Having been educated and spent my life in the operating department and that on a system where the departments are entirely separate, I will devote my paper to transportation, from an operating standpoint.

In my opinion there has not been the improvement in the methods of handling trains and yard matters which might reasonably have been expected taking into consideration the improvements in all other departments. The great question with railroads now is, how to handle traffic with the smallest outlay and in the shortest time possible. What a few years ago was considered good time for a passenger train is now looked on as poor time for a freight train, and there is still room for improvement. Freight trains are rushed over hundreds of

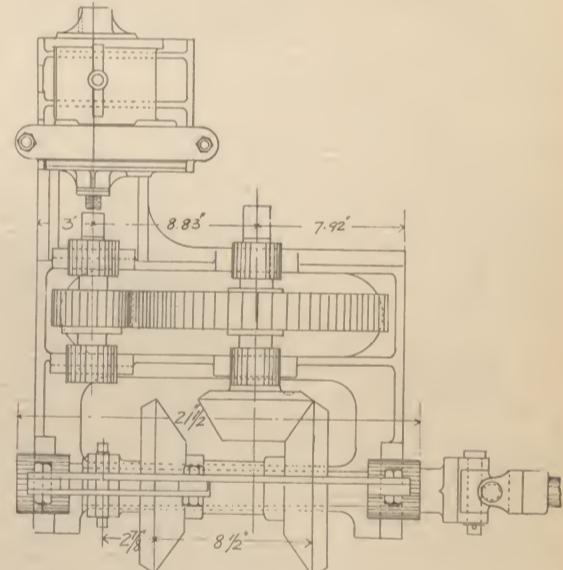
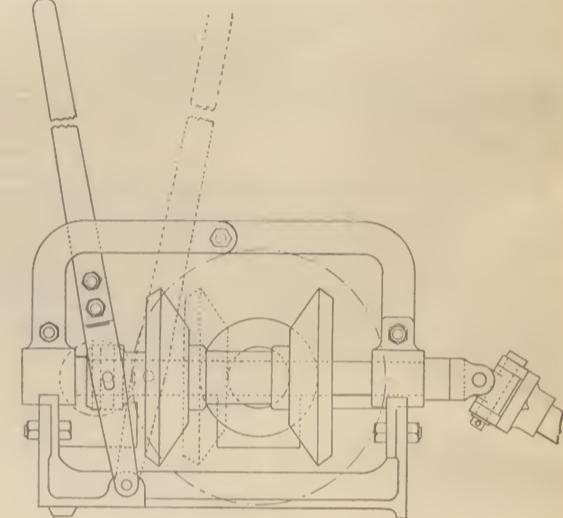


sion took place. Members wishing to take up any part of the report were instructed to meet the committee after the session, and on the next day condensed statements of criticism of this lengthy report were to be presented to the convention, thus saving the time of the convention, and its proceedings of the following days, will be treated in a later issue.

AIR MOTOR IN LOCOMOTIVE VALVE SETTING.

A characteristic labor saving device in use at the Topeka shops of the Atchison, Topeka & Santa Fe Ry. is illustrated in the accompanying engraving from a drawing received through the courtesy of Mr. John Player, superintendent of machinery, and Mr. G. W. Smith, master mechanic at Topeka. The device was designed by Mr. Smith to aid in the work of setting the valves of locomotives. The rollers usually employed are placed under the forward drivers of the locomotive, and this attachment is coupled to the shaft which turns the rollers so that power may be substituted for hand labor in turning the wheels.

The device consists of a frame of cast iron supporting a train of gears for reducing speed and also for reversing the motion of the shaft. A small air motor of the rotary type is mounted on the frame in a suitable saddle which is so arranged as to permit of removing it easily for use elsewhere if desired. The form of the motor is shown in the illustration and also the strap which passes over the cylinder and secures it upon the frame. The motor used is one of the type designed and made at these works which has been found to be highly satisfactory in many parts of the work of repairing in the locomotive shops. The gearing reduces the speed of rotation in the ratio of from 125 of the motor spindle to 24 of the roller spindle. This machine enables the valve setters to work much more rapidly than is possible when they must wait for the wheels to be rotated by hand. Another advantage beside the saving of time is that the wheels may be moved so easily as to enable the benefits of complete rotation of the wheels to be obtained instead of the partial movements back and forth which are sometimes indulged in to save time. There need be no doubt of the back lash all being taken out. The question naturally arises as to whether making these movements by power admits of the close adjustment necessary in catching the tram points, but in practice there is no difficulty in this direction. The outer end of the shaft carrying the large spur gear and the level pinion is squared for the reception of a wrench if specially fine work is required, but it is seldom found necessary to use this.



AIR MOTOR IN VALVE SETTING.

miles of road only to be delayed in terminal yards or at interchange points. It takes longer on most railroads to get a car from the warehouse to the point where it is made up in a train ready to start on its journey, than it does to run the train a hundred miles, and then at the terminal it takes still longer to get it to the warehouse or connecting line.

Our superintendents' meetings are having a beneficial effect on this and too much cannot be said in regard to the good resulting from the interchange of views at these meetings, still I think we might profitably devote more time to the problem of a still more improved means of handling business through terminals and division yards.

A great deal is said about our great double and four track railroads, but I hold that a good single track railroad with properly equipped yards and warehouses, is capable of better results than one with any number of main tracks and poorly equipped terminals.

My ideal of a railroad is one that has warehouses where freight can be taken from the consignor and loaded into cars or taken from cars and delivered to consignee with the minimum amount of handling and the least loss of time, and one that has yards where cars can be properly drilled out and grouped

*Read at a meeting of the Toledo Association of Railroad Officers.

together at one point and thus save switching at other points; yards, where the first cars to arrive are the first cars to leave. With very few exceptions, railroads are doing their switching the same as it was done when steam railroads first came into existence, and it costs these roads more to get a car through their yards than over any one hundred miles of their line.

In the first place, a train arriving pulls in and occupies a track in the distributing yard and if several trains are in company a track is occupied by each one and no switching can be done until the whole fleet has arrived, and is gotten out of the way, and the chances are that then this yard is blocked so as to render switching to any advantage almost impossible. A switch engine takes hold of the train and the first move is to pull the train back out of the yard, and for every cut that is made, the whole or greater portion of the train must be handled with the result that, draw bars are pulled out or broken and cars receive more damage than they will receive on a trip over the whole line.

Railway companies have come to realize that in order to meet competition, it is necessary to reduce grades, increase the capacity of engines and cars and in every way possible reduce the cost of transportation, but they do not as yet seem to realize, that in order to make this a success, it is necessary to equip their stations and terminals so as to meet the improvements in other quarters. If the capacity of freight engines is increased, it is just as necessary that the capacity of the yard be increased in proportion.

I know of no place where there is such a chance for reduction of cost of handling as at terminals. In order to accomplish this, yards need not necessarily cover any larger territory, but they can be so laid out that the switching can be done properly and thoroughly, without loss of time or waste of power, and thereby a large reduction in cost and far better results may be arrived at. What is true of yards is

to a Westinghouse compound engine guaranteed to develop 500 h. p. at a steam pressure of 150 lbs. and 250 revs. per minute.

On the marble switchboard room is provided for the necessary apparatus for four feeders and for the apparatus belonging to the generator. The machine panel has a double-pole switch, a double-pole circuit breaker and an ammeter for 500 amperes. Each one of the feeders is provided with a single-pole switch, single-pole circuit breaker and an ammeter for 500 amperes. The main panel is occupied by a station voltmeter and room is left for a main ammeter. All the instruments used are made by the Western Electrical Instrument Company, Newark, N. J.

The track is laid in 70 lb. rails and has common fishplate joints, in addition to which "Chicago bonds" are used to secure proper contact between the different lengths of rail. To decrease the resistance of the rails a special No. 00 wire is used as extra return tire. This wire is soldered to all the Chicago bonds and extends across from one end of the road to the other.

The overhead construction is very much like that of a common trolley road. The two feed wires, of 500,000 C. M. area each, of which one is about five miles long and the other seven miles, are suspended on the wooden poles on one side of the track by means of special insulators.

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Johnson insulators and ears are used. The feed wires tap into the trolley wires every 600 ft.

The cars, of which the trucks and the woodwork are manufactured by the Jackson & Sharp Co., Wilmington, Del., are forty-three feet long over all, and of the combined passenger baggage pattern. The weight of a car fully equipped is 51,000 lbs., and it seats fifty passengers.

One car is equipped with four No. 38, 50 h. p. motors, and the two other ones have two No. 39, 75-100 h. p. each. Two cars are geared for a speed of 45 miles per hour, and the third one for 60 miles per hour.

The controllers are of the series-parallel type. Each car has two trolleys, as the current used would be very heavy for one.

As the hand brakes would not give satisfactory results

miles and by special arrangement. Since that time they have run on test carefully timed at rate of one mile in 50 seconds, or 72 miles per hour.

We generally use a voltage of 550 volts at no load, which gives us about 600 v. with 300 amp., the generator being over-compounded.

There was some trouble with the trolleys leaving the wire at the start; but modifications in the arrangement removed this difficulty, and they can be relied upon up to speed of 50 miles per hour. At any higher speed some attention is necessary.

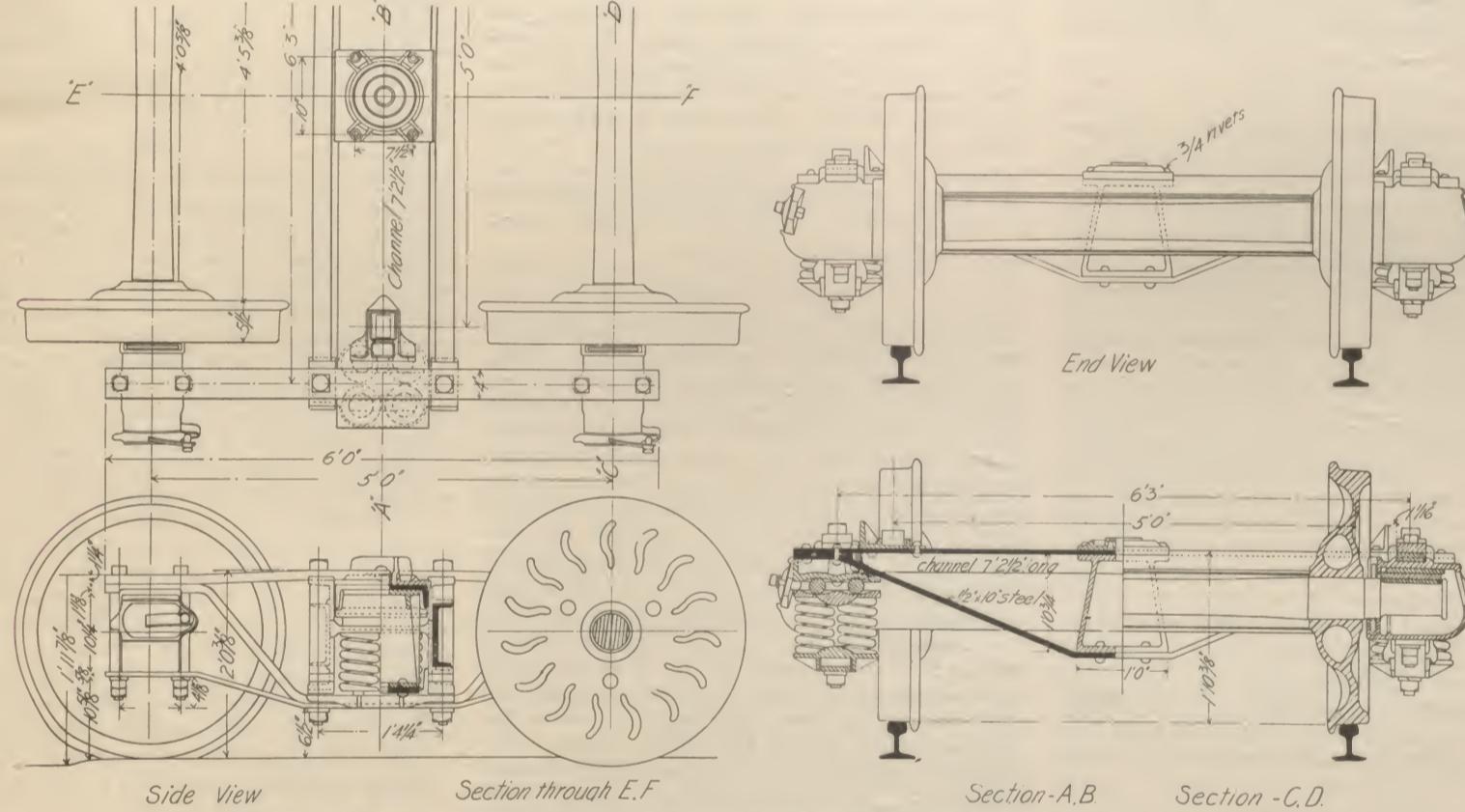
During all the time the road has been open for passenger traffic we have had absolutely no trouble on account of electrical or mechanical defects, only for late steam train connections, although the cars most of the time have been only temporarily rigged up.

We do not generally run more than one tram car, a P.R. R. passenger car of 45,000 lbs. weight, but have occasionally run two, the one mentioned above and an Adams Express of 50,000 lbs. The speed reached with one trailer is about 45 miles per hour, and with two trailers 38 miles per hour.

We run two motor cars at present, starting at 6:35 a. m. and stopping at 10:50 p. m. Each car makes nine round trips a day between Mt. Holly and Burlington, which is equal to 132 miles per day, and crew consisting of one motorman and one conductor. This gives a number of thirty-six trains a day on the branch.

THE BARBER FREIGHT TRUCK—CHICAGO, MILWAUKEE & ST. PAUL RAILWAY.

During the last meeting of the Western Railway Club, a discussion was held upon the subject of the comparative merits of rigid and swing motion freight car trucks and in connection with the discussion, Mr. J. N. Barr, superintendent of motive power of the Chicago, Milwaukee & St. Paul Railway, alluded to the success which had been met with upon that road in the use of what is known as the Barber type of truck. This truck has been in use for several years to a limited extent and it will probably prove of interest to see the arrangement of it which



THE BARBER FREIGHT CAR TRUCK—CHICAGO, MILWAUKEE & ST. PAUL RAILWAY.

also true of warehouses, meeting and passing tracks and all other transportation facilities.

As I take it, the object of having papers presented is for the purpose of stirring up interchange of views and promoting discussions and if my feeble efforts have had this effect, what trouble I have been to will be amply rewarded.

ELECTRICAL EQUIPMENT—MT. HOLLY BRANCH PENNSYLVANIA R. R.

At the February meeting of the New England Railroad Club Mr. Calvert Townley, of the Westinghouse Electric & Manufacturing Co., delivered an interesting address upon the subject of the application of electric traction to roads previously operated by steam from which the following description of the installation on the Mt. Holly branch of the Pennsylvania Railroad is taken:

The power house is located at Mount Holly, one of the end stations of the 7 1/2 miles long road. It is a framework building lined with corrugated sheet iron, and is built on piles which extend about 10 ft. above the swamp. The dimensions of the building are about 50x80 ft. divided into two parts—engine room and boiler room. The boiler is an upright Climax, guaranteed to evaporate 9,000 lbs. of water per hour without undue forcing. The feed apparatus used is one Worthington steam pump and a Kortting injector. The water supply is taken from Rameo Co.'s creek.

The 225 K. W. eight-pole generator is direct-connected

at the speed we run, the cars are equipped with Westinghouse automatic air brakes. The air compressor is run by an electric motor, which has an automatic starting and stopping device which starts the compressor when the pressure in the main reservoir is 70 lbs., and shuts it off again as soon as the pressure has reached 100 lbs. per square inch. The brake is controlled by an engineer's valve similar to the one used on steam locomotives; and in order to enable the motor man to control the working of the automatic device, double-handed air gages, indicating the pressures in the reservoirs, are mounted above the engineer's valve.

A regular locomotive bell is used for the signals at crossings, etc., and a small gong gives the starting and stopping signals.

All the cars are equipped with controller at both ends, to run either way, like a street car.

Half the length of the road is up grade and the other half down grade, the heaviest grade being 80 ft. to the mile, and about three-fourths of a mile long.

The first car was started for experimental purposes on the third of June this year, (1895) but the road did not open up for passenger traffic before July 22. The electric cars have only been used to carry passengers and baggage, the freight being handled by steam. During the fair week last month we often had an Adams express car and our baggage room in the motor cars completely full of baggage and accommodated the passengers besides, often having 2,000 of them a day. As the machinery in the power house is too weak for more we could only run two motor cars at a time. The highest speed attained at present with the electric cars was one mile in 57 seconds, 64 miles an hour; but this was with a car geared for only 45

is employed upon the road mentioned. This truck makes use of diamond side frames, the arch bar of which is nearly horizontal and approximately straight. One of the principal difficulties experienced with rigid trucks is the strain in the couplers which is caused by forcing the coupler against the draft timbers in passing curves, the motion in the trucks themselves being too limited to provide the necessary clearance for the coupler. In the type of truck illustrated, more flexibility is secured than with the rigid truck and yet the objection which has been raised to swing motion trucks on account of the large number of parts, is absent in this design.

This form employs two 8 in. channels secured to the arch bars in the usual manner. The truck bolster itself is composed of a straight upper member in the form of a 12 in. channel and a tension member of $\frac{1}{2} \times 10$ in. steel with a cast king post of box form 12 in. wide at the bottom. This tension member is riveted at the ends to the channel and directly under its ends are castings with two depressions for the rollers by means of which the load is transmitted to the springs through the medium of a cast spring cap in which properly formed cavities are provided for lower seats to the rollers. The bearing surfaces for the rollers are such as to return them to their central position, after passing curves. The chief dimensions of the truck and the mode of construction are so clearly indicated in the illustration that further description seems unnecessary.

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CHICAGO, SATURDAY, APRIL 18, 1896.

NOTHING has arisen to disturb the iron trade for a few days. The advance in raw material and the growth of the association spirit to maintain the strong prices is something of an anomaly in the face of a rather moderate and disappointing demand. The one factor to give a vigorous impetus to trade in railroad requirements, and it does not arise. Buyers act as though they do not believe outside quotations can be maintained and that lower selling prices for rails, shapes, plates and railway fastenings are probable.

SPACE is given this week to the text of a bill introduced into the Ohio legislature providing for reciprocal demurrage. Whether or not the provisions of the bill are the best calculated to meet the difficulties which have given rise to its submission it is not now intended to discuss, but whatever may be the facts in that regard, the theory underlying the bill is correct. The principal misfortune is that it should be found necessary to appeal to the legislature for the establishment of a proposition of this kind. Railroad legislation is not calculated to favor railroads, and in a case like the one under review, where it can be shown that railroads have not been fair in the matter, the peoples' representatives will not take any large amount of pains to protect their (the railroads) interests. It will be much better if the railroads of Ohio, as well as those of all the states, would forestall legislative action by putting into effect such regulations as will recognize the rights of the shippers in this particular. Not only is such action due the patrons of railroads, but it is believed the effect of such a regulation upon car movements would be found fully as profitable and beneficial to the roads, as was the car service regulation when first introduced demonstrated to be of actual profit to the shippers.

IT IS probably useless to deny that since the decision by the supreme court in the Brown case, under which witnesses will be compelled to testify concerning the act to regulate commerce there has been no little apprehension on the part of some railroad people, as to the probable course of the Interstate Commerce Commission. This feeling has undoubtedly been somewhat intensified by the reports in the daily papers of the visits of a "detective" to certain railroad offices for the purpose of procuring evidence to be used in the prosecution of cases. This impression needs to be corrected. Whatever may have been necessary in the past, there no longer exists any reason for resorting to such methods in the administration of the law. The Interstate Commerce Commission is not conducting a detective bureau, nor as has heretofore been pointed out in these columns, in the prosecution of cases for violation of the law its principal function, as many would seem to suppose. The gentleman referred to, Mr. John T. Marchand, is by no means a detective, but a duly accredited representative of the commission, and employed for altogether a different purpose. That the members of the commission, no persons are better advised that the more nearly representative are those to whom they delegate any authority, the more complete will be the information furnished by the railway officials when called upon.

Now that it is possible to get at the truth, no one will be more ready to see that the commission is informed of the facts than the officials of those roads whose business suffers because of the violation of law; and appreciating this fact it will be the policy of the commission to work in harmony with those roads that propose to obey it.

AMONG the interesting and valuable statistics recently published by the division of forestry of the department of agriculture is a circular which contains some facts and figures in regard to the forest resources of the United States which in some respects are surprising. The statistics of forestry are imperfect and therefore only approximate statements are made. The entire forest acreage of the country exclusive of Alaska is stated in round numbers to be about 500,000,000 acres, which does not include brush and waste land without economic value. Seven per cent of this area is upon the Atlantic slope, one per cent on the Pacific slope, one per cent on the Rocky Mountains and the rest distributed over the western states. The New England and southern states have fifty per cent of their area still covered with forests, but in the former the larger part of the merchantable limber has been removed. The prairie states, with an area of about 400,000 square miles contains less than four per cent of forest growth, and more than one-third of the whole country contains practically no forest growth whatever. The vast importance of the forestry interests is perhaps not fully appreciated, and in view of the foregoing the relative standing of forestry and other interests as shown by the compilations of this division are worthy of note. It is stated that agriculture stands first in regard to capital, number of persons employed and value of products. The industries relying upon forest products stand easily second and exceed the value of the products of the mining industries by more than fifty per cent. This constitutes an additional reason for the exertion of every effort looking to the conservation of the forest resources, and furnishes an argument in support of those who are endeavoring to secure more economy in the use of timber in structures. The better grades of lumber are appreciating in value and there seems to be excellent ground for urging care in the use of this material by those who are consuming it as rapidly as are the railways.

A SUBJECT which has received a great deal of attention at the hands of mechanical officers of railroads is methods of preventing hot boxes on trains, and, though much has been said and written about it, anything which will assist in reducing the number of delays due to this cause will be acceptable to the men who are troubled in this way. Some valuable suggestions were made in explanation in a discussion recently held by the Central Railway Club in Buffalo, N. Y. The fact was brought out that some of the members had found difficulty in the winter upon passenger equipment greater than that which was experienced during the warm weather, and the experience of one member was given in which this was explained and the trouble obviated by removing all the summer oil from the waste that was in the boxes at the opening of the colder season. The difficulty seemed to be that the waste when allowed to retain the oil intended for warm weather, and with which it was saturated, would not absorb the winter oil which would lie upon the top of the waste and not being soaked into the fibres, would not be properly fed up to the bearing. The warm weather oil being thoroughly soaked into the waste, would permit the fibres to stiffen on account of freezing and then the packing was without value in the feeding process which it was intended to carry on. As soon as the winter oil is gone from the top of the waste little benefit is obtained from the other oil, because the freezing of the waste causes it to jar away from the journal, which results in heating. The question was raised as to whether the high temperature of a hot box would not then melt the oil in the waste and cause it to feed again. The question does not seem to have been very satisfactorily answered and the reason why this result is not attained seems to be that the damage is done to an irreparable extent, the subsequent thawing out of the waste coming too late. Also the freezing of the summer oil in the waste together with the jarring seems to destroy the feeding properties in such a way that they are not restored when the frost goes out of the box. This idea is perhaps not new but the suggestion made by Mr. Waitt in regard to squeezing out the summer oil and storing it for the next summer season is an excellent one and one which might be laid away to be brought up again at the next approach of cold weather.

RESPONSIBILITY FOR REDUCED REVENUES.

The forty-second annual report of the Chicago, Burlington & Quincy Railroad which has been issued during the current week shows that while the earnings have been relatively less than the preceding year the expenses have been proportionately greater, and that the net income was somewhat less than four per cent upon the capital stock of the company. This condition of affairs was taken by President Perkins as a text from which to make some pertinent observations, which we print on page 213. More sound common sense has rarely been crowded in fewer lines. The business of railroading is so interwoven with our entire commercial fabric that any injury thereto cannot fail of severely reacting upon the entire business world. It is probably true that the health of the commercial world is more correctly indicated by the railroads than by any other department, including that of banking, and, as President Perkins says, it is "a very great mistake to suppose that statutes which add to the hazard and subtract from the profits of a great branch of business like that of transportation can benefit the community at large."

It is to be regretted, however, that President Perkins considers legislation chiefly, if not wholly responsible for the condition in which railroads find themselves. Legislation has been both unwise and unnecessarily severe, but the efforts of legislators in the matter of reducing rates have not proved half so effective as the conduct of the railroads themselves. In making this statement no reference is had to the action of any given legislature or any particular road. It is only intended to say that taking the entirety of legislation on the one hand and railroad management on the other, the present reduced basis of revenue is directly chargeable to the railroads in a much greater degree than to the law makers, and it is probably true that had one-half of the time and money which has been spent in opposition to unfavorable legislation been devoted to an effort to compel the maintenance of rates by railroads themselves, revenues would be in a much more satisfactory condition than at the present time.

Two principal misconceptions are responsible for this failure. In the first place, too many railroad managers have looked upon railroads as a piece of private property with which interference was unlawful, or if lawful was unjust, and as a consequence they have resented what they deemed an intrusion upon their rights by legislative bodies. This idea, although not now so common as formerly, nevertheless still prevails in some quarters and is responsible for much of the opposition to government regulation which is still manifest. The other misconception is the idea that violations of the law by a competitor should not be complained of. Should the treasury of any railroad be robbed by an official of another road, no manager would hesitate for an instant to enter a complaint against the guilty party, but many a railroad official has through the manipulation of rates been just as truly guilty of robbing the treasury of his competitor with the full assurance that no unpleasant consequences would result. Justice to the stockholders of the roads and justice to the community alike demand that these misconceptions shall be overcome, and in their place shall be substituted a better understanding and a better compliance with the principles and practice of good railroading.

THE METRIC SYSTEM.

For a number of years the question of international systems of weights and measures has been the subject of study and deliberation until there are few persons directly concerned in such matters who are not more or less familiar with the situation, but the result of the effort that has been made toward the establishment of an international standard seems likely to be somewhat interfered with on account of what might seem to be a lack of a thorough understanding of the situation. The question of metrical standards is brought to attention at this time in two ways, namely, the fact that the committee on coinage, weights and measures of the house of representatives has recommended the fixing of a standard of weights and measures by the adoption of the metric system and also by the action of the Swiss government which has recently invited the European nations to a conference at Berne at which the adoption of a uniform gage of screws based on the metric system, will be discussed. England and the United States, not having adopted the metric system, were not invited to the conference, and therefore the deliberations will be conducted without special reference to this country. It is of interest to know that the system devised by the "Societe d'Encouragement pour l'Industrie Nationale," and which is based upon

the metric system, is likely to be adopted at that conference. This system is used by the French admiralty and it is noteworthy that the thread is almost the exact form of that in universal use in this country under the name of the "United States Standard" or the "Sellers System." The pitch does not differ much from the Sellers or the Whitworth systems but is made to conform with the metric measure, therefore though this country is not represented it probably will not be difficult to adopt the admiralty standard if it should be deemed advisable, as the only change which would be required in cutting the screw heads upon lathes with lead screws divided upon the inch basis would be to use change wheels one hundred twenty-seven teeth. It seems unfortunate that this country is not represented, but whatever may be the opinion as to this, our interests are not likely to suffer except as they may be affected by the difference between the metric and the inch standards.

The bill which has been pending before congress for the adoption of metric weights and measures, passed the house of representatives last week by a close vote, but afterward was reconsidered and was sent back to the committee on coinage, weights and measures for further consideration. It is doubtful what the outcome of this will be but it is likely to defer further action until after the close of the present session. It is thought by many that the expense and the confusion which would attend the change is of sufficient importance to require perpetuating the present systems, and this feeling is probably the cause of deferring the question; but it is believed by others, and among them men of the highest scientific attainments, that while giving due consideration to the inconvenience which would arise in carrying out the change, the great advantages of a convenient and systematic arrangement of weights and measures, and the ultimate good which would result therefrom would seem to outweigh the temporary inconvenience which would be incurred. Other nations which cannot be admitted to be more progressive or intellectual than ours have met with and overcome all of the difficulties and seem to be enjoying nothing but benefits from the change.

It is stated in objecting to the metric system that the fractional parts of an inch are more easily fixed in the mind than are the metric measurements corresponding in size. It is also urged that the advantages of a decimal system which are generally admitted, might be had and still retain what is termed "our standard", namely, the "inch". Others contend that no one, after carefully investigating the metric system, will admit that other methods are more convenient. In answer to the second objection, which merely amounts to the adoption of the decimal system without the international feature, it should be stated that the United States is already, according to the report of the committee referred to, committed to the meter as a derivative of its present units of measure, whether expressed in metric or English units. In 1870 the United States was represented in connection with Germany, Austria-Hungary, Belgium, Brazil, Argentine Confederation, Denmark, Spain, France, Italy, Peru, Portugal, Russia, Sweden and Norway, Switzerland, Turkey and Venezuela, in a conference which was afterward joined by Servia, Roumania, Great Britain, Japan and Mexico, the object being to establish and maintain a scientific and permanent international bureau of weights and measures located at Paris. The direct object was to discuss and initiate measures for the improvement of the metrical system. The convention was ratified by the senate, new standards were prepared, and duplicate copies distributed to the several nations. Those for the United States are in Washington and are kept with the standards of weights and measures in the Coast Survey Building. These have been recognized by the secretary of the treasury as the fundamental standards from which the customary units of the yard and pound should be derived, and these are now in use at the custom houses of this country.

It therefore seems that by the action of congress in this connection the standard yard and therefore all of our measures of length, are now coincident with the metric basis. It is also a fact that measures of the metric system are legalized and recognized in the courts of this country, the only step lacking being that the metric system is not generally used. It seems fitting here to remark that in the international postal convention of 1874, which is now in force between the United States and fifty other nations, the metric system and terms were agreed upon and are now used, according to this committee, between these nations, which, by the way, include England. The mail matter transported being weighed and paid for in terms of metric weights.

As regards the position which the United States has taken with other American countries on this matter, it is appropriate to quote from the report as follows: "In 1888 (by resolution of May 24th,) this country invited the republics of Central and South America, Mexico, Hayti and San Domingo to a conference to be held in the city of Washington to consider among other things, the adoption of an uniform system of weights and measures. The invitation was accepted; the conference was held. To the extent of its power, it adopted an uniform system of weights and measures. The other nations, parties to the conference, with scarcely an exception have honorably proceeded to put in force in their respective limits, the metric system thus adopted." The United States, the originator of the conference, stands alone in not abiding by its action. A legal standard of weight has been established for use in the mint, but beyond that our weights and measures commonly used rest on custom only, with indirect legislative recognition. Permission has been given for the use of the metric weights and measures and standards of systems have been furnished by the government to the several states. The customary system has been adopted by the treasury department for use in the custom houses, but by formal order, the metric standards have been taken as fundamental from which the measures for the system used have been derived.

It is now urged that the matter be pushed to a logical conclusion and as showing that the subject has been pretty thoroughly stirred up in England, strong recommendations have been made by the select committee of the house of commons in favor of the metric system and in this action the leading chambers of commerce have been influential. The arguments for the change are convenience of the system itself and the advantages which would arise from a universal system which would be used by all, including those interested in commerce and in science. These last named would probably derive the greatest benefit from the international feature but all others would participate in and enjoy the improvement secured by the convenient arrangement of the units.

SHOP NOTES—ATCHISON, TOPEKA & SANTA FE RY., TOPEKA, KAS.

The Topeka shops of the Atchison, Topeka & Santa Fe Railroad are exceedingly interesting and give at once the impression of being progressive in a most practical way. Neither the shop plant or the machinery are generally up to date in the sense of being of the newest construction, but as regards the quantity of work turned out the plant is so operated as to distance many upon which much money has been spent for new machinery. Mr. John Player, superintendent of machinery, is ably assisted by Mr. G. W. Smith, master mechanic, and Mr. John Hodge, master car builder. The shops are characterized by noticeable activity of the men in all the departments and this together with the great number of processes usually performed by hand, to which pneumatic power has been applied, made it difficult to obtain a proper idea of the works in a visit of only a few hours' duration.

Car Department.—The first part of the works to be visited was the freight car repair yard, where the feature of greatest interest was a pneumatic spray painting machine, devised by Mr. Jas. Collinson, master mechanic of the road at Ft. Madison, Ia. This consisted of an air brake auxiliary reservoir mounted in a vertical position upon a light two-wheeled truck.

This reservoir was filled with common mineral freight car paint by means of a plug screwed into its top. The paint was drawn from the bottom of the reservoir through a quarter inch pipe to an atomizer where the paint came into contact with a stream of air from another pipe connected with the top of the reservoir and also to a hose connection which was provided with an air brake coupling for attachment to the air pipe system with which the yards are equipped. For the spray the end of the delivery pipe was flattened. The flow of air and paint is regulated by cocks. The machine is easily handled by one man, who with it does all of the priming and also puts on the second coats of mineral paint in all the car work of these shops. It requires little attention and the time required for painting the body of a box car including the roof was stated to be about twenty minutes. The work is smooth and the air pressure drives the paint into the wood better than it can be done with brushes. It also has the advantage of saving the expense of brushes and does not require expert attendance.

A device similar in principle is used to burn off old paint from passenger cars in the passenger car paint shop. This also makes use of an auxiliary reservoir, in the bottom of which gasoline is placed, the level of the surface being shown by a gage glass. The tank is connected to the air pipe system by a hose which brings the pressure into the reservoir, but first it is reduced to about ten pounds pressure by passing through a small reducing valve. The

mixed air and gasoline vapor is taken from the top of the reservoir by a hose long enough to reach any part of the car and the burner with its controlling valve is placed in the end of the hose. This idea is not new, but the application is believed to be original with the inventor, who is one of the employes of the road. A new pneumatic device was seen which is used for taking off the roofs of freight cars in repairing them. This consists of a freight brake cylinder with a removable wooden bar of sufficient length to reach to the roof boards while the cylinder rests upon the car floor inside. The bar is placed in the cavity in the top of the air cylinder plunger and its upper end placed under the board to be removed. Air is admitted to the cylinder by a hose connection and off goes the board. One man can remove a roof with it in about five minutes and without injuring the boards or car lines. Pneumatic ram devices are used in an ingenious way for forcing the parts of the Player brake beams together in constructing them and also in pulling them apart for repairs. These devices require but one man and do away with the helper formerly employed. In the car repair shop there is a table equipped with an air motor and head stocks to receive the shanks of reamers and other tools for refitting air brake angle cocks. A similar and much more elaborate table has been fitted up in the locomotive machine shop for repairing and refitting other air brake parts. The ingenious devices for pressing the fittings upon air brake hose, which are used at these shops have been described and also the devices for cleaning seat cushions by air blast.

In the planing mill a planer and matcher made by the Fay people is used for dressing and matching box car sidings. This machine originally had two heads for matching both edges of a board simultaneously, and by the addition of a third head the machine is made to exactly double its output by passing two boards through at once, the center head matching the inside edges of both boards while the other two heads match the outside edges. This idea was worked out by a workman in the mill. In passing through the car shops an opportunity was given to learn of Mr. Players' experience with malleable iron in car and other construction. He has never had a failure of this material and speaks most highly of its value. It is also being used in locomotive cab construction. The difference between the castings of malleable and grey iron is nicely shown in the piles of stock where some of the old grey castings fairly loom up beside the trim, light and stronger ones of malleable iron. In answer to a query as to the punishment which the latter material would stand, Mr. Player had the men in the hand car shop twist a malleable walking beam for a hand car through nearly 90 deg. and back again with a pinch bar and the piece was as good as ever. This casting was from a lot recently received from the National Malleable Castings Company. This test would doubtless prove too severe for a welded wrought iron beam. This material has been used for over 1000 hand car wheel centers without one broken one being reported. These centers were illustrated in the RAILWAY REVIEW of February 23, 1895. Mr. Player estimates that he saves 50 per cent in the weight of car castings by use of this material and with an actual saving in first cost due to the lightening of the castings.

Scrap Material.—The scrap, of which a large amount is received at Topeka, is sorted as it is unloaded and is used or put at once, as far as is possible, into condition to be used again. The castings are used in repair work and the wrought material such as rods and bolts are straightened and put through the bolt machines and worked into bolts. The rods are straightened by an old steam hammer located in the yard near a small building containing five small furnaces and several pneumatic tools. This small shop is operated entirely by air, which also works the old hammer referred to. In the shop is an ingeniously contrived pneumatic scarfing machine which scars the ends of rods, eye bolts and brake rod jaws preparatory to welding under a 400 lb. upright cylinder steam hammer which is also operated by air. The valve of the hammer is controlled by the foot of the operator, and the exhaust blows away the scale from the work, doing away with a hammer boy and a helper. The hammer outside the shop is also used for straightening old freight car links which are heated inside. Those which are good are returned to stock and broken ones are closed up and sent to the forge shop to go into piles for axles. The use of air here effected a saving of \$65 per month in doing away with the steam plant which was required for the hammers. There is a convenient pneumatic bulldozer in this shop and altogether it is a lively place. With the old arrangement a blacksmith and helper could make about 40 brake rod jaws per day. Now one man makes 130 and the capacity is limited only by the ability to heat the material.

Forge Shop.—Side and main rods are worked without welding, the ends are formed in dies and punched under the steam hammer. There is no machine work done on the portion between the ends, and the work is so smooth as to make it entirely unnecessary to do more upon them. This shop has an 800 lb. upright hammer worked by air and the plan seems to be entirely successful. Die work has been carried out in every possible direction and formers are used

for bending links of different forms, such as safety brake hangers. The tires for hand car wheels are made here with dies under the heavy hammer. Punches and shears rigged for steam power are driven by air and are made to do the work on 1x12 in. freight car bolsters.

Boiler Shop.—It is in the boiler shop that the greatest development of labor saving appliances has been reached. Among these are narrow gap riveters with which the end castings of a truck frame are riveted to the channels in five minutes. There is a number of other riveters varying from 5 to 10 ft. gap and arranged for riveting shells, fire-boxes, mud rings, tanks and smaller work. These are all portable except the shell riveter and all are operated by pneumatic power. The mud ring riveter is arranged so as to be used under a fire-box without disturbing the engine and it is mounted upon a truck for carrying it about the shops. The staybolt holes are tapped and the staybolts are screwed in by pneumatic power and a special pneumatic shear is used to cut off the ends on the bolts outside of the sheet preparatory to riveting. The cost of labor in tapping a hole, screwing a staybolt home, and cutting it off on the outside ready for riveting is often between 10 and 15 cents each and the value of this pneumatic machine is apparent when it is stated that in this shop the cost for labor per staybolt is but one half cent.

Machine Shop.—In the machine shop special appliances are not numerous and the chief interest centers in the remarkable work which is turned out by old tools. An axle lathe was first encountered taking a heavy chip from the wheel fit of an iron axle at a cutting speed of 43 ft. per minute. These machines have been speeded up several times and it is thought that the limit has not yet been reached. Fifteen axles are turned per day of ten hours on this machine which would make the cost for labor, including setting the axles in the lathe, 15 cents per axle. The cutting speed of the driving axle lathe is now 36 ft. per minute and is to be increased. A driving axle is turned and quartered in 2½ hours at a cost of 63 cents. Driving boxes are bored upon an old horizontal table boring mill and a cut is taken across an 11 in. box in 2½ minutes. The workmanship is not sacrificed in the least. The planers are given a cutting speed of 20 ft. per minute and a neat dodge for saving time consists in increasing the size of the pulleys driving the return motions of the planers from 12 to 48 in. diameter. It is intended that this shall be applied to all planers, even the largest for cylinders. No difficulty is found on account of suddenness of the motion. The wheel press in this shop has two pumps, one for quick motion having a 2 in., and one for high pressure having a ¾ in. plunger. It was noticed that the men always used the small plunger with the slow motion and upon investigation it developed that the large plunger would stall the machine at about 40 tons pressure. The problem of getting 100 tons pressure with the large plunger was solved as follows. The pumps work on the down stroke and the plunger is raised on the other stroke. A heavy counter weight was bolted in the pulley on the pump and on the same side of the center as the crank. During the up stroke the weight was raised by the belt and upon the down stroke the weight assisted the belt in forcing the plunger down, thus dividing up the work of the belt and about doubling the capacity of the press.

The smoke arch seats on the saddle castings are made upon a large planer when the valve seats are planed off. Several kinks are in use in this shop which cannot be described for lack of space. The tin shop is equipped with an air press and set of dies for stamping. Brass cocks and valves are made rapidly and chiefly by means of special tools made to fit the tool holders of the lathes and which cut to the exact sizes both the outside and the inside of the cocks. Wing valves are made by a single tool which turns the wings and the seat beside giving the necessary clearance. These are made by one man at the rate of 300 per day as against 100 per day with ordinary lathe tools. The driving wheel lathes have been fitted with two sets of tool rests, one set for the tires and the other for turning the journals so that with one setting of the wheels both tires and journals can be finished though both operations cannot be done at once. The bolt shop contains seven screw cutting machines which are run at a high speed and turns out about 100 bolts each per hour if of less than 18 in. in length. One man looks after the oil and the dies. The oil is extracted from the chips by a centrifugal machine such as was described and illustrated in the RAILWAY REVIEW of Jan. 18, 1896. It is made by the Lodge & Davis Machine Tool Company of Cincinnati, O. This machine takes very nearly all of the oil out of the chips and leaves them dry. By this means the oil may be used repeatedly. Before this machine was put in the bolt threading required 60 gals. of oil per week and now only 23 gals. of new oil are used, the rest being saved by the machine.

The air compressor for this plant was described and illustrated in the RAILWAY REVIEW of Jan. 25, 1896. It was furnished by the Rand Drill Company. It is operated almost without cost, as it takes steam from a boiler plant under which the refuse of the planing mill is burned. This plant also furnishes steam for the mill engine and the attendant of the engine looks after the compressor also. The air motors used are rotary and were built at these shops.

There are other interesting features of these works which cannot be described for want of space, but we hope to illustrate the most interesting features later.

THE WORK AND INFLUENCE OF THE AMERICAN RAILWAY ASSOCIATION.*

H. S. HAINES.

Ten years ago, in this very city of Cincinnati, the American Railway Association was formed by the consolidation of the General Time Convention with the Southern Railway Time Convention. In looking backward over this decade, what justification do we find for the existence of this Association? To what extent has it fulfilled its object—"the development and solution of problems connected with railroad management in the mutual interest of the railroad companies of America?"

Had it accomplished nothing else than the general adoption a standard time, or the preparation of the standard code of train rules, or the adoption of the interchangeable type of automatic freight car coupler, or of the standard height of freight car draw bar, or of the uniform location of hand holds and grab irons, or the general recognition of car service associations, the development and solution of either one of these problems, all of which are due to this association, would in itself have justified its existence.

But the work which in the past it has accomplished is but an earnest of its possible usefulness in the future. Those who have observed its growth appreciate its adaptability to the broader fields of the utility in the mutual interest of the railroad companies of America. It is not only available for co-operation among the railroad managements themselves, but also as the means of communication between the American railway system as a whole and the American people as a whole on any matter affecting the practical management of railroads.

This was forcibly illustrated by the service which the association was able to render in the congressional legislation which resulted in the safety appliance act. The public interest which had been excited for the protection of railroad employees in coupling cars, found vent in the vigorous demand for statutory measures that was recognized in the platforms of the two principal parties then about to engage in a contest for the election of the president of the United States. The congressional committee on interstate commerce undertook to determine technical questions relating to safety appliances. Voluntary committees of state railroad commissioners and of labor organizations came to their assistance. Inventors, cranks, promoters and lobbyists played a part as well, until an opportunity was offered for the representatives of the American Railway Association to appear before the congressional committee to which the preparation of the bill had been entrusted. It is to the credit of members of this committee that they recognized the character of the men that constituted this delegation. They recognized that they were thoughtful and well informed, experienced in the matter of which they spoke, and earnest in their desire to bring about a reform in the general use of railway appliances; that they represented no cliques, no combinations; that they were influenced by no unworthy motives, but that they represented the American railway system as a whole, and were able and willing to indicate the proper solution of a problem beset with many difficulties. The committee listened to them patiently and with interest. They saw the way to relieve themselves from deciding matters of technical detail, of which they were ignorant, by referring them for determination to a body of acknowledged experts, the choice of the men who manage the practical affairs of the railways of this country, and to-day you will find in the railway safety appliance act that to the American Railway Association has been given the authority to designate the technical details contained in that act, which is now the law of the land.

The way has thus been provided for determining similar details for future legislation, for where can be found a body of men better equipped to determine them or whose conclusions would be more readily accepted by the American people as embodying the most modern railway practice? And recently the way has been also opened to even a broader field of usefulness for the American Railway Association.

What was known in this country of the International Railway Congress, which has for many years fulfilled a similar purpose across the Atlantic ocean, until our own association was represented in that body at the London meeting of 1895? A representative of some one of our principal roads had occasionally appeared at one of its previous meetings, but the invitation to our association for membership aroused an interest which led to the appearance of over forty American delegates at the London Congress. It is true that this was but a small minority of the seven hundred and fifty delegates present, but the effect produced by their appearance on this occasion was out of all proportion

*Address delivered at the meeting of the American Railway Association, held at Cincinnati, Ohio, April 15, 1896.

to their numbers. The very fact that they represented a greater railway mileage than all the other railway delegations particularly emphasized the presence and importance of the American delegation. The additional fact that they were akin in blood and language to the British delegates who were our hosts was another cause for giving them a prominent place on many occasions. The opportunities there afforded for personal acquaintances with distinguished representatives of the railroad managements of Continental Europe, South America, of Asia and of Australia, and of impressing upon them the merits of American practice, were of a character that could not have otherwise been obtained. And there is reason to believe that impressions then made upon the minds of these men, who control the construction and operation of the railways of that other half of the world beyond the seas, will tend to increase their desire to know something more about the appliances and methods which in one generation have covered our country with a net work of railways about equal in mileage to the remaining railways on the face of the earth.

And here, again, is a field of usefulness for the American Railway Association, the extent of which and of its importance to our people cannot be adequately appreciated by those who were not present at that congress. It is the introduction of American railway methods of construction and equipment and operation on that tripartite continent of which Europe is the smallest member.

Of that continent of thirty-three million square miles Europe constitutes but one-ninth in area, and yet Europe is larger than the United States. Of the total railway mileage of the world nearly one-half is in this country and most of the other half is in Europe.

It is to the other great members of the trans-Atlantic continent—it is to Asia and Africa that I would draw your attention, with their area of nearly twenty million square miles and their population of one thousand million human beings. I would ask you to lose sight of the greatness of your own people for a moment, of your population of sixty-three million and your territory of three million square miles, and think of these other lands with ten times your area and fifteen times your population.

Is this great field for railroad construction and management to be disregarded by those who are wont to boast of American energy and enterprise? Are we to remain contented with the restricted possibilities for American railway men and for American manufacturers of railway material in the maintenance and operation of roads within our own national boundaries? So long as we were adding from ten to twelve thousand miles a year to our existing mileage the opportunities thus afforded them might have been sufficient for their numbers and for their productive capacity, but the conditions are now becoming different, both for railroad men and manufacturers in this country. We are approaching gradually to the conditions which prevail in Europe, where there are more men and larger productive plants than can be profitably employed at home, and the time is not far distant when we also must look abroad for their employment.

But it would be a waste of time to seek for such opportunities either in Great Britain or in the western states of continental Europe. For European railway construction and appliances and methods of operation have been firmly founded on British practice; a practice so different from ours in all respects, even in technical terms and in ordinary railroad slang, that our own railroad men would there be out of place, whether as constructing engineers, as locomotive runners, conductors, brakemen or switchmen, and our manufacturers of rails, equipment and appliances as well.

Indeed, Great Britain and the western European states themselves now look abroad for profitable employment for their men, their manufacturers and their surplus capital. Great Britain has found already her field in her own colonies and foreign possessions. France has her vantage ground in Africa, in Algeria and Senegal. Little Belgium, with her eleven thousand square miles of territory and her six million people, has established hers in equatorial Africa, and the Germans, just now outgrowing in productiveness their own needs, are eagerly watching and imitating their British kin-folks. Austria-Hungary, with half our population, is stretching her rails and her trade down the Danube and into the Balkan Peninsula.

In considering this general advance of European countries all along the strategic line of this campaign for African and Asiatic trade, we may well say, what will be left for the United States, when we begin to look beyond our borders? On the north of us in Canada, British by sentiment, and but partly American in railroad practice. To the south of us is Mexico, where we have some advantage over European methods and appliances; some little opportunity in Cuba and Jamaica, and more perhaps in Central America. Then comes the semi-continent of South America, with nearly twice our area and half our population.

This is our sphere of action, or at least that which will be left to us if we close our eyes to what is going on elsewhere on the globe, while European methods of railway construction and operation are being initiated in the vast regions of the earth still unpro-

vided with modern facilities for transportation. If we wait until 50 miles is built from one African seaport and 20 from another into the heart of that continent, all under the British system we may say farewell for employment thereafter for any American men in those regions or for the sale of railway appliances of American make.

If French or Belgian or German engineers lay out a railroad line anywhere on the habitable globe the French or Belgian or German appliances follow, as surely as the thread follows the needle. There is Russia with twice our area and nearly double our population, just inaugurating a trans-continental railway system. That great empire was represented at the London congress by a delegation of intelligent experienced men, eagerly seeking for information. The Japanese representatives, too, were special inquirers as to American methods.

For, after all, American methods are best suited for opening up routes on which the traffic has yet to be created. Whatever is best in European practice is best adapted to routes which are intended to furnish facilities for existing traffic. It is just the information as to cheap methods and cheap appliances which is wanted by those who are pioneers in opening up the interior of Africa and of Siberia, and it is just this information which they will never get in Great Britain or on the continent, for in those countries they have but one way of doing anything in railroad practice. There is but one pattern and all kinds of cloth must be cut to suit it. They have loaded down their secondary railroad systems with expensive structures and interlocked switches and the attendant host of employes, so that even at home there still remain considerable communities without sufficient railroad facilities because they cannot be operated with profit as constructed in their way; yet we have, perhaps, thousands of miles of track paying expenses on less traffic.

It is not our first class roads, our trunk lines, that the projectors in those untried fields can study to advantage. These roads approximate in cost of construction and management to those with which these projectors are already familiar. It is the cheap road, the cheap methods of operation that their interests require, and of which they are ignorant. They look upon a single track road operated on American methods simply as a death trap; something that is only operated at the peril of both passengers and employes. When the American delegates spoke at the London congress of handling 50 or 100 trains a day and 30,000 or 40,000 cars a month over a single track the statements were evidently received as specimens of American brag.

Now, what opportunity is there for American methods and appliances getting even a foothold in lands where European influences prevail? Evidently but little, so long as European ignorance prevails as to American methods and appliances, and it is just here that the value of the American Railway Association comes in; that is, in pointing out the way for penetrating this ignorance, for dispersing the clouds of prejudice and the fog of indifference which obscure the minds of those European engineers who control the purse strings of the European capitalists who are to provide the means for constructing the untold thousands and tens of thousands of miles of railroad yet to be built in Asia and Africa and elsewhere, outside the present limits of American influence.

Our experience at the meeting of the International Railway Congress in London has impressed upon our minds the hopelessness of any attempt to remove European ignorance and prejudice as to American railway practice by discussions held across the ocean. We cannot teach by precept. We must teach by example. Instead of addressing the 700 or 800 railway engineers and managers that make up the International Congress in a land where there is not one example of American railway practice, let us induce that great body of men foremost in railway reputation and experience throughout the world, to come and listen to us here, where every word that we speak will be multiplied in effect one thousand fold by what they will find all around them.

It is a case in which a great result is to be sought, one of momentous importance to the future welfare of our people, and the effort to accomplish this result must be correspondingly great. Desultory, isolated attempts will fail. Our energies must be concentrated to be effective, and the most effective way to concentrate them can only be afforded by the American Railway Association.

The next meeting of the International Railway Congress is to be four years hence in Paris, at the time of the exposition, and from what I learned unofficially at the London meeting, I believe if a proper effort be made on that occasion, the succeeding meeting can be held in the United States, but if such an effort is to be made, then no time should be lost in preparing to make it, for there is much to be done if we are to offer such hospitality as was accorded to the congress last year in Great Britain, and we should not offer less to those whom we invite across the ocean to visit us.

I do not know that I could have selected any subject for my address, on this the last occasion on which I shall have the honor to appear before you as your president, that could more fitly emphasize the termination of my nine years of service in that

office. I say this because I appreciate the honor which you bestowed upon me when, in my absence and without my knowledge, you selected me as your principal representative at the meeting to which I have just referred, and where my eyes were opened to the enormous possibilities that I have just unfolded to you. I mention this only as the chief one among the many signal testimonies that I have received at your hands during my long term of office, of your continuing appreciation of my devotion to the great cause which you represent, and I shall always feel that in this one instance alone I have been fully rewarded for all my efforts in your behalf.

And now that I am about to say farewell, permit me to direct your minds for a moment to the principle which in my opinion, should ever be the touch stone to be applied to any subject that may be presented for your consideration.

The object for which you are organized is distinctly stated in your rules of order as "the development and solution of problems connected with railroad management in mutual interest of the railroad companies of America." Your action is only "recommendatory in its character," and "not binding upon any of the companies represented." So long as these cardinal points in your rules of order are carefully observed, your deliberations and conclusions will be of increased value to the railroad companies constituting the members of this association.

But it will be an evil day when they are ignored, when the "mutual interest of the railroad companies of America" shall be disregarded, or when the action of this body shall be considered as anything more than "recommendatory in its character."

Your proceedings have heretofore been harmonious in their results. However earnest your discussions, however decided your opinions, you have all sought the same end; honestly to work out the problems before you, in the mutual interest of those whom you represent, and so it may be expected to continue, so long as you discuss nothing but practical matters, so long as you strictly keep away from the matters involving questions of revenue to your members. You are not votaries of Mammon. You seek the truth with reference to questions affecting the maintenance and operation of the great railroad system of this country; its practical management has been intrusted to you, and while you continue to be guided by the principles which constitute the foundation of your association, your feet will be in the right path, and the structure which you have been building up for the past ten years will maintain its stability and increase in usefulness.

But, however careful you should be to remember that the action of this association is only recommendatory in its character, do not be unmindful of what that action represents. It represents the convictions of the foremost railroad officials of this country, as to the best methods of American railway practice; convictions reached with such opportunities for gathering information as no single one of you possesses, and reached, too, after the careful deliberation of your standing committees, selected by yourselves as the most competent among you to apply their large experience to the solution of the problems submitted to them for determination. After the solutions thus reached have been laid before this body, composed, as it is, of those who are confessedly the ablest and foremost in the land in their own profession, and the seal of approbation is here stamped upon the conclusions of one of your standing committees, who is there so great in himself that will undertake to deny that the solution of any of the problems of railway management thus obtained is not in accordance with the best practice and is not in the mutual interest of the railroad companies of America, after it has been approved by the American Railway Association?

NOTICES OF PUBLICATIONS.

The Ashton Valve Co., 271 Franklin street, Boston, has just sent out a new catalog for 1896 which embodies many improvements upon others previously issued under its name. This is a pamphlet of 80 pages and is standard size 6x9 in. and contains under one cover a fully illustrated list of the pop safety valves, pressure and vacuum gages together with steam and hydraulic specialties for which this company is so well and favorably known. The illustrations are accompanied by descriptions and sizes as well as given in nearly all cases. Some of these specialties have been upon the market for 20 years and during this period changes have been made when improvement was found necessary. The gage department was added to the business three and a half years ago, but notwithstanding the hard times, it is stated that this line is in excellent condition. The catalog contains a moderate amount of useful information at the end, and is provided with a good index. The arrangement and letter press are excellent and the catalog is a success in presenting in a most satisfactory manner the information for which it is likely to be consulted. The illustrations are good without exception. They are wood cuts with one exception, a half-tone portrait of Mr. Henry G. Ashton, the founder of the company. Steam users should send for this pamphlet.

SOMETHING ABOUT WESTINGHOUSE ENGINES—MATERIALS AND WORKMANSHIP. Paper: 15 pages; The Westinghouse Machine Co., not standard size.

This little pamphlet explains the methods employed by the Westinghouse Machine Company in the construction inspection and testing of the product of its works. It is generally known, as the pamphlet records, that this company has no direct dealings with users of their engines, but that the entire product of the works is marketed

through independent concerns who purchase the engines and becomes directly responsible therefore to the customer. By agreement a resident inspector is maintained at the works under the pay and control of these selling agencies. This inspector is a man of the highest mechanical attainments with wide experience in the best shops in this country and in Europe. By virtue of his position he is not interested in the number of engines turned out per year or in the cheapness with which they can be built, but rather to see that perfect engines are constructed which will satisfy the user. The manner in which the inspectors are carried out are described briefly.

TECHNICAL MEETINGS.

Semi-annual convention of American Society Mechanical Engineers, May 19 to 22, St. Louis, Mo.

Annual convention Master Car Builders' Association, June 17, Saratoga, New York.

Freight Claim Association, May 6, Chicago, Ill.

Association Railway Claim Agents, May 27, Monongahela House, Pittsburgh, Pa.

International Association Car Accountants, June 9, Cleveland, Ohio.

Annual convention American Master Mechanics' Association, June 22, Saratoga, New York.

Association American Railway Accounting Officers, May 27, New York City.

Association Railway Telegraph Superintendents, June 17, Fortress Monroe, Va.

American Association General Baggage Agents, July 15, Philadelphia, Pa.

The American Society of Civil Engineers holds meetings on the first and third Wednesdays in each month, at 8 p.m., at the House of the Society, 127 East Twenty-third street, New York City.

The Association of Civil Engineers of Cornell University meets weekly every Friday, from October to May inclusive, at 2:30 p.m., at Lincoln Hall, New York.

The Boston Society of Civil Engineers, meets monthly on the third Wednesday in each month, at 7:30 p.m., at Wesleyan Hall, 36 Bromfield street, Boston, Mass.

The Canadian Society of Civil Engineers meets every other Thursday at 8 p.m., at 112 Mansfield street, Montreal, P. Q.

The Foundrymen's Association meets monthly on the first Wednesday of each month, at the Manufacturers' Club, Philadelphia, Pa.

The International Irrigation Congress will hold its fourth session at Albuquerque, N. M., September 16-19. Fred L. Alles, secretary, Los Angeles, Cal.; local secretary, W. C. Hadley, E. M., Albuquerque, N. M.

The Montana Society of Civil Engineers meets monthly on the third Saturday in each month, at 7:30 p.m., at Helena, Mont.

The New England Railroad Club meets on the second Tuesday of each month, at Wesleyan Hall, Bromfield street, Boston, Mass.

The New York Railroad Club has a monthly meeting on the third Tuesday in each month, at 8 p.m., at 12 West Fifty-first street, New York City.

North-West Railway Club meets alternately at the West Hotel, Minneapolis, and the Ryan House, St. Paul, on the second Tuesday of each month.

The Railway Signaling Club holds its meetings in Chicago, Ill., on the second Tuesday of January, March, May, September and November. G. M. Basford, secretary, 818 The Rookery.

The Southwestern Society of Mining Engineers will hold a session at Albuquerque, N. M., September 16-19. Walter C. Hadley, secretary, Albuquerque, N. M.

The Southern & Southwestern Railway Club holds its meetings on the third Thursday of January, April, August and November, at the Kimball House, Atlanta, Ga.

The Western Railway Club of Chicago, holds its meeting on the third Tuesday of each month.

The Central Railway Club meets on the fourth Wednesday of January, March, April, September and October, at 10 a. m., at the Hotel Iroquois, Buffalo, N. Y.

The Technical Society of the Pacific Coast has a monthly meeting on the first Friday in each month at 8 p.m., at the Academy of Sciences building, 819 Market street, San Francisco, Cal.

The Civil Engineers' Club of Cleveland, meets on the second and fourth Tuesdays in each month, at 8 p.m., at the Case Library building, Cleveland, Ohio.

The Association of Engineers of Virginia, holds its informal meetings on the third Wednesday of each month from September to May inclusive, at 8 p.m., at 710 Terry building, Roanoke, Va.

The American Society of Irrigation Engineers. Third annual meeting will be held at Albuquerque, N. M., September 16-19. John L. Titcomb, secretary, 36 Jacobson block, Denver, Col.

The Denver Society of Civil Engineers meets on the second and fourth Tuesdays in each month except July, August and December, when they are held on the second Tuesday only, at 36 Jacobson building, Denver, Colo.

The Engineers' and Architects' Club of Louisville has a monthly meeting on the second Thursday in each month, at 8 p.m., at the Norton building, Fourth avenue and Jefferson street, Louisville, Ky.

The Engineering Association of the South meets on the second Thursday of each month at 8 p.m., at the Cumberland Publishing House, Nashville, Tenn.

The Engineers' Club of Cincinnati has a monthly meeting on the third Thursday in each month, at 7:30 p.m., at the Literary Club, 24 West Fourth street, Cincinnati, O. Address P. O. Box 333.

The Engineers' Club of Minneapolis holds its meetings on the first Thursday in each month, at Public Library building, Minneapolis, Minn.

The Engineers' Club of Philadelphia meets on the first and third Saturdays in each month, at 8 p.m., at the house of the club, 1122 Girard street, Philadelphia, Pa.

The Engineers' Club of St. Louis meets on the first and third Wednesdays of each month, at the Missouri Historical Society building, Sixteenth street and Lucas place, St. Louis, Mo.

The Engineers' Society of Western Pennsylvania holds its monthly meeting on the third Tuesday of each month at 7:30 p.m. at the Carnegie Library Building, Allegheny Pa.

PERSONAL.

Mr. W. H. Sliney, general yardmaster of the Erie Railroad has been transferred from Waverly to Binghamton.

Mr. James O'Brien, superintendent of car service of the Canadian Pacific, has been appointed assistant to the vice president.

Mr. C. H. Morrow has been appointed commercial agent of the Baltimore & Ohio at Boston, vice Mr. M. W. Davidson, resigned.

Mr. R. L. Walker, general agent of the Ocean Steamship Company, has resigned. General Manager Sorrel will perform the duties for the present.

Mr. W. S. Wilson, superintendent of the Cairo Short Line, has been appointed assistant superintendent of the new St. Louis division of the Illinois Central.

Mr. Louis Donough, joint traveling passenger agent of the Cincinnati, Hamilton & Dayton and the Monon lines, will retire on May 1 and take service as fireman on the C. H. & D., preparatory to running an engine.

An official circular announces the appointment of Mr. James H. Shaw formerly supervisor on the Western New York & Pennsylvania, as roadmaster on the New York Central's Auburn branch.

General Manager Mills, of the Columbus, Hocking Valley & Toledo, has appointed Mr. S. S. Stiffey master mechanic of the Wellston & Jackson Belt Line, with headquarters at Columbus.

Mr. Thomas H. Hubbard has been elected vice president of the Southern Pacific Company, succeeding Mr. A. N. Towne, deceased. Mr. Hubbard represents the Seales interest in the property.

Mr. Horace Johnson, superintendent of telegraph of the Baltimore & Ohio Railroad on the Ohio division, with headquarters at Chillicothe, Ohio, will be made general superintendent of telegraphs on the entire Southwest system, with headquarters at Cincinnati.

Mr. Charles Barham has been appointed soliciting freight agent of the Southern Railway, Piedmont Air Line, and Asheville Line, New York City, with office at 271 Broadway, reporting to General Agent R. D. Carpenter.

Mr. James G. Mooney was, on April 13, appointed traveling passenger agent of the Chicago Great Western, with headquarters at Cincinnati. His territory will be Ohio, Kentucky, Tennessee and Illinois, and Indiana south of a line drawn through Richmond and Terre Haute.

Mr. Ward B. Wetherell, formerly general agent of the Erie lines at Cleveland, O., has been appointed general Northwestern agent of the same company. Mr. Wetherell will open an office at once in the Endicott arcade, St. Paul, Minn.

Mr. D. J. Flynn, traveling passenger agent for the Rock Island road for Colorado & Utah, died at Denver, Sunday, of pneumonia. He was formerly with the Erie road, but went there six years ago for his health. He was 33 years of age.

Mr. John R. McCord, who, for the past three years has represented the passenger department of the Cincinnati, Hamilton & Dayton Railway in the territory tributary to Toledo, is, to the regret of his friends and associates in that city, about to return to Cincinnati, in the capacity of excursion agent in Cincinnati territory.

It is unofficially understood that Mr. W. H. Rosevear, chief car accountant of the Grand Trunk at Montreal, will be made chief of the entire Grand Trunk system, and that the office of Mr. Vogel, chief accountant at Detroit will be abolished, instead of consolidating the two offices, as was at first announced.

Mr. Ike Chesbrough, chief clerk to Assistant General Passenger Agent Buskirk, of the Erie, has resigned to become rate clerk for Chairman Donald, of the Central Passenger committee. This is new position, and becomes effective April 20. Mr. Chesbrough was formerly chief clerk in the Erie general passenger department at Cleveland.

The Mexican Railway Company has issued the following notice from the office of the general manager. Mr. H. G. Evans having resigned the position of locomotive superintendent, Mr. Alfred Attwood has been appointed to the post. Mr. Attwood will have entire charge of the rolling stock, machinery and floating material of the company.

Mr. Merle Middleton, who has for some years past been representing the Safety Car Heating & Lighting Co. in the west, has left that company and gone to Philadelphia with the Standard Steel Works. Mr. Middleton has been wonderfully successful in introducing Pintsch gas on the western railways and probably has as many good friends among railway men as any man in the country. The Standard Steel Works is exceedingly fortunate in securing his services.

Mr. George B. Hoyt, recently in charge of the customs and postal division of the Civil Service Commission at Washington, has accepted service with the Joint Traffic Association as assistant to Commissioner Blanchard. He will have charge of the preparation of reports on freight matter to the various committees. Mr. Hoyt has for a number of years been out of the railroad business, but he had extended experience with the Baltimore & Ohio, Erie, Wabash and many other roads.

At the annual meeting of the American Railway Association, held at the Burnett House, Cincinnati, Ohio, on April 15, the following officers were elected for the ensuing year: President, E. T. D. Myers, president Richmond, Fredericksburg & Potomac Railway; first vice president, E. B. Thomas, president Erie Railway; second vice president, Joseph Wood, fourth vice president Pennsylvania Company; members of executive committee, William H. Baldwin, Jr., vice president Southern Railway, and Rollin H. Wilder, general superintendent Lehigh Valley Railroad.

Mr. Edward S. Orr has been appointed as general agent of the Baltimore & Ohio Southwestern in St. Louis. He will have absolute charge of freight and passenger traffic

matters in that city and the Western territory, and will be, at the same time, the authorized representative of the executive department. In the west the ordinary "general agent" has been regarded as a rather unimportant subordinate, but Mr. Orr will occupy no such position. He will be "the road" only in this territory, he will report to the traffic manager and the general manager, and his authority will be practically unrestricted.

Mr. Geo. B. Whittlesey, chief clerk in the office of general freight agent of the Erie has been appointed assistant general agent of that road. Mr. Whittlesey's railroading has been confined to the Erie. He began in 1881 as a clerk in the general freight office and advanced from one desk to another during the following ten years, when when he was appointed contracting agent at Cleveland. He remained on the outside for eighteen months, and then was appointed chief clerk of the freight department. Now as assistant general freight agent he will look after the business which has heretofore been in charge of Mr. Shane, now assistant general freight traffic manager.

Mr. George T. Anderson, late superintendent of the Indiana Car & Foundry Company has been appointed superintendent of the Chicago, New York & Boston Refrigerator Company, vice F. W. Brazier, lately appointed general foreman of the car department of the Illinois Central. Mr. Anderson entered upon his duties on Monday last, at Chicago, having charge of all the line cars, as well as extensive shops at Fifty-first street, on the Chicago & Grand Trunk. It is considered one of the most desirable positions of the kind in Chicago, and there were, it is said, many applicants for the place.

Mr. Arthur De Armas, general agent of the Baltimore & Ohio road at New Orleans, has sent in his resignation to that company. Mr. De Armas has been with the Baltimore & Ohio road for seven years and is considered one of the best men the company has had in the passenger service. He had been all this time in New Orleans, and has a host of friends there. Prior to going to the Baltimore & Ohio he was with the Queen & Crescent, entering upon his first railroad experience with that line. He remained there three years, when a promotion was given him to the position he has just vacated. It is understood that Mr. De Armas has served positions under consideration but as yet has made no choice for the future.

Mr. Shigemichi Fugiti, M. E., vice locomotive superintendent of the Nippon Railway Company of Japan, returned to this country on the 9th instant, after a tour through England, France and Germany for the purpose of visiting the railway shops and manufactories of those countries. Mr. Fugiti saw all the most important shops this country last fall, and is now on his way home. He sails from Vancouver on the Canadian Pacific Railway Company's steamer Empress of Japan, on the 20th instant. The Nippon Railway has placed an order for thirty-six locomotives with an English builder, but Mr. Fugiti will recommend that machine tools for the company's new shops be purchased in this country, as he found all the new and best machinery in English shops was built here.

Mr. Sam P. Shane, general freight agent of the Erie, has been appointed assistant general freight traffic manager of the Erie, and also of the Chicago & Erie. Just 25 years Sam Shane started upon his railroad career as a messenger boy in the Panhandle general freight office at Pittsburgh. After nine years he had progressed to the position of chief clerk in the same office. In 1880 the Erie promoted him and made him general agent of that company at Pittsburgh. Mr. Shane continued to handle the Erie's important freight business at Pittsburgh until 1887 when he was promoted to general freight agent and went to Cleveland to succeed Mr. Cochran, who was then promoted to traffic manager. As general freight agent Mr. Mr. Shane has remained in the service of the company, at Cleveland, until now he receives this additional promotion.

Mr. Donald M. Philbin, the former general manager of the Duluth, Mesaba & Northern has been appointed general superintendent of the Duluth & Winnipeg. Mr. Philbin was born in Montreal, Canada, in 1857, entering railway service as a clerk in the construction department of the Chicago & Northwestern in 1874. In 1875 he went with the engineering corps where he remained two years. From 1877 to 1886 he had charge of the ore docks at Escanaba, Mich., and from 1886 to 1888 was in charge of the ore dock of the Milwaukee, Lake Shore & Western road at Ashland, Wis. In 1889 he went to the Fremont, Elkhorn & Missouri Valley as superintendent of the eastern division, and from there he went to the Duluth South Shore & Atlantic as superintendent where he remained until April, 1893 when he accepted the position he now resigns.

Among the changes lately made on the Illinois Central incident to the acquisition and reorganization of the Cairo Short Line, now the St. Louis division of the Central, are the following: Mr. George E. Lary, formerly general freight and passenger agent of the Cairo Short Line, is appointed assistant general freight agent of the Illinois Central, with headquarters at St. Louis. His jurisdiction will cover the freight business originating and tributary to St. Louis; also that of the lines formerly controlled by the St. Louis Alton and Terre Haute. Mr. E. F. Hilgard, formerly assistant general freight agent, retains his position, with merely a change in title. Mr. C. C. McCarty is appointed division passenger agent, with headquarters in St. Louis, and with jurisdiction covering all passenger business originating in and tributary to St. Louis, as well as local business of the lines formerly controlled by the St. Louis, Alton & Terre Haute. Mr. McCarty has heretofore been the Cairo Short Line's representative at Paducah. Mr. L. T. Swancutt is appointed traveling freight agent and W. H. Brill is also appointed traveling passenger agent, both with headquarters at St. Louis. Mr. B. J. Rowe is also appointed traveling freight agent. The traveling freight agents will report to Assistant General Freight Agent Lary. Commercial Agent Shelby will remove his office to the general offices in the Lacledes building. Mr. C. F. Parker is appointed general agent of the company at St. Louis. He will have charge of matters pertaining to the traffic and transportation departments at this point, and will also have charge of the terminals at East St.

Louis. Mr. H. McCourt is appointed superintendent of the St. Louis division, with office at Centralia, Ill. The office of Mr. H. Baker, superintendent of the Chicago division, will be at Central Station, Chicago. Mr. A. H. Egan is appointed assistant superintendent of the Chicago division, with office at Fordham Yard, Chicago, and will have special charge of the transportation service of the Chicago Terminal District. Mr. J. W. Higgins is appointed superintendent of the Amboy division with office at La Salle, Ill.

RAILWAY NEWS.

Ann Arbor.—Construction work on the Ann Arbor extension has begun in earnest at Toledo. Rails have been laid on the new terminals from Ottawa river to Cherry street where the company's new depot is being built. A large steam shovel is cutting down the grade at Elm street, and two engines, are at work hauling dirt. At the Whitmore cut-off, the contractors have two steam shovels and a large force of men pushing the work as rapidly as possible. Besides this, the Ann Arbor has two steam shovels making numerous improvements all along the line. A number of depots are being improved and rebuilt. At Howell, a new joint depot is being built.

Atlantic & Pacific.—The final decree in the foreclosure case of the United States Trust Co. vs. the Atlantic & Pacific R. Co. and others which has been signed by Judge Collier, provides that if the company fails to pay within ninety days, the amount due for principal and interest upon the bonds, the property shall be sold to the highest bidder at Gallup, N. M. The master is directed to accept no amount less than \$5,000,000. Mr. C. N. Marron was appointed as master to make the sale.

The decree of the court that the purchase of the road must be by cash payment may interfere largely with the plans of the Santa Fe Co., which is known to desire to become the owner. It is understood the bid of the Santa Fe reorganization committee for the property was \$8,000,000 of Atchison 4 per cent bonds and the entire land grant of the road. In other words, the Atlantic & Pacific bondholders could take about 45 per cent in Santa Fe bonds and keep the land, the Santa Fe returning the land grant bonds. The Atlantic & Pacific committee refused this offer, and Chairman King sent experts over the line, who reported a valuation of about \$5,000,000. It would seem that, while the Santa Fe reorganization committee made provisions for the purchase of the Atlantic & Pacific, it was not considered that a cash payment would have to be made. The Southern Pacific is said to want the road, not so much because it wishes to operate it as to cripple the Santa Fe, which has no other western outlet except by a roundabout way through southern New Mexico.

Chicago, Burlington & Quincy.—The forty-second annual report of the Chicago, Burlington & Quincy directors, covering the operation of the road for the year 1895 is now out. The report shows a deficit on the main system over and above the dividends and all charges of \$232,362, as compared with a deficit of the previous year, after paying 4½ per cent in dividends of \$1,103,946. The capital stock remains unchanged. There is a net debt of \$1,621,500 for miscellaneous construction. For the first time in the history of the road there was no change in the mileage operated during the year. The reduction in debt during the year aggregated \$1,411,500, of which \$875,000 was bonds matured, which were paid, and the balance was purchased for sinking funds and cancelled. The net increase of funded debt was \$1,612,500, making total debt \$127,152,900. The total amount of stock and bonds outstanding on Dec. 31, 1895, was \$200,157,100.

Denison & Northern.—Receiver Moran Scott, of the Denison & Northern road has been authorized by Judge Kilgore to issue receivers' certificates against the road for 104 miles of road to be built at \$11,000 per mile. This is done in accordance with a proposition of the Mineral Belt Construction Co., which is to build the line, and it is required that the construction company file a bond of \$100,000 for the faithful performance of the contract. On April 8 Col. James Beeks, a Chicago attorney, representing New-B. Chiles of Kansas City, one of the principal stockholders and vice president of the Denison & Northern, made application to the court to have the order rescinded, authorizing the Mineral Belt Construction Co. to build the road. Mr. O. H. Brown, president of the Denison & Northern, and who is also secretary of the Mineral Belt Construction Co., was present and opposed the application. The controversy seems to have arisen over different interests in the Hickory Hill Coal & Coke Co., adjacent to the road, and Col. Beeks seeks to defeat the contract entered into with the Mineral Belt Construction Co. The court took the matter under advisement, referring certain details to the master in chancery for investigation. There no longer remains any doubt but that the road will be built, the main contention at present being as to which faction shall build the road. About 100 teams have been at work on the line at Dougherty since Monday, and all matters will be properly adjudicated by next week.

Excelsior Springs.—On application of the bondholders and other creditors of the Excelsior Springs R. Judge Broaddus of the court at Chillicothe, Mo., has appointed Messrs. H. N. Garland and C. A. Braley of Kansas City, receivers of the road. The road which is 9 miles in length has defaulted its interest, and there are judgments against it for the right of way. It taps the Wabash at the Missouri river.

Florida East Coast.—The spike driver on the Florida East Coast R. extension from Palm beach south reached Miami, the present terminus of the road in the middle of last week. Workmen are now engaged in surfacing the track and getting everything in readiness for the operation of the line. This new extension from Palm Beach to Miami is 67 miles, making the distance between Jacksonville and Miami a total of 367 miles. The road traverses the east coast in an almost unbroken line, and its terminus is at the southernmost point reached by any railroad in the United States. The first train was to run over the new extension on Wednesday of this week.

Florida Midland.—Argument of counsel of parties at interest viz John H. Dawe vs. Florida Midland, original bill and American Trust Co. vs. the Florida Midland cross

bill, have been heard on the motion to confirm the sale of the road, made by Dennis Eagan, special master. The matter was submitted to the court, and an order confirming the sale made on March 2 to M. E. Bishop for \$25,500 was entered by the court. It was further ordered that upon payment to the special master of \$23,000—the balance of the purchase money, within seven days, the special master shall make and deliver to the purchaser a good and sufficient deed, free from all liens and valid taxes prior to the taxes of 1895, and deliver the property to the purchaser. The receiver of the property is ordered to file a report of all of his acts and doings since January 1, 1896, and all parties at interest are allowed ten days to file exceptions to the report, or any of the items contained in the report. This case has been pending for a long time in the court and is now about ended. It is thought by the time all the lawyers get their fees out of the case there will be very little of the \$25,500 left for the creditors of the road. The road has never paid. It is a little road beginning at Longwood, on the South Florida R., and runs through a good fruit and vegetable country to Kissimmee.

Georgia Midland.—The Georgia Midland & Gulf, which was sold under foreclosure some time ago, has been reorganized with \$1,000,000 capital stock under the name of Georgia Midland R. Co., and has been formally transferred by the receiver, Mr. John F. Flournoy. The directors are R. A. Lancaster and Wm. H. Palmer, of Richmond; G. Jordan, of Columbus; George Sherin, of New York, and John F. Flournoy, Seaton Grantland, Charles L. Davis, A. Ilgess, R. A. Lucke and J. H. Archer. The following are the officers: R. A. Lancaster, president; John F. Flournoy, vice president, T. C. S. Howard, treasurer; N. D. Lancaster, secretary. C. W. Chears will continue as general manager. The reorganization plan will soon be submitted. It is reported an extension to Atlanta is under consideration.

Green Bay, Winona & St. Paul.—The date for the sale of the Green Bay, Winona & St. Paul road has again been set for the afternoon of May 12, at Green Bay, Wis. The master is directed to reserve \$105,000 with interest from the proceeds in order to protect the bondholders represented by Mr. Mowery if the court of appeals finds in his favor. It is thought there is a probability that the property will pass into the hands of the Chicago & Northwestern.

Jacksonville, Tampa & Key West.—On petition of the American Construction Co., the complainants in a suit against the Jacksonville, Tampa & Key West, the foreclosure sale under the consolidated mortgage has been postponed until May 4, the first Monday in the month. The July, 1895, interest on the first mortgage bonds has not been paid. Over four-fifths of the firsts have been deposited with the Winthrop committee, but no steps have as yet been taken by the committee looking to foreclosure under the first mortgage or to reorganization. The consols are represented by Simpson, Thatcher & Barnum, of New York.

Lake Superior & Ishpeming.—This road which is projected to run from Marquette to Ishpeming—a distance of about 19 miles—is about two-thirds graded and tracklaying will begin about May 1. The contracts for the road, bridges and ore dock have been awarded to Winston Brothers of Minneapolis. Construction on this road began December 13, 1895, and up to April 1, 800,000 cu. yds. of material had been moved, 80,000 ft. of piles driven in ore and merchandise docks and 15,000 ft. in bridges. The grading involves some heavy work, but the only important iron bridge is one over Dead river, 430 ft. long. Mr. W. S. Mather, of Cleveland, is president of the company, and Mr. S. S. Neff, of Marquette, is chief engineer.

Michigan, Ohio & Southern.—At a meeting of the stockholders of the Columbus, Lima & Milwaukee held on April 15 it was decided to change the name of that road to the Michigan, Ohio & Southern. A cancellation of the old mortgage bonds and a new issue of \$10,000,000 each of stock and bonds was authorized. It is the plan of the new company to absorb the West Virginia, Ohio & Western, Columbus, Lima & Milwaukee, Detroit & Toledo Short Line, Central Michigan, Michigan & Ohio Belt Line and several other short roads in Michigan and Ohio, thus connecting the coal fields of West Virginia and Ohio with the lakes. Work will be commenced at once on those portions of the road from Columbus to Defiance and from Detroit to Toledo. The following directors were elected: Marcus Pollasky, Lester O. Goddard, James T. Hall, Chicago; Harry A. Conant, William F. Jarvis, Detroit; D. J. Cable, W. L. Parmenter, Lima; Edward P. Hooker, Defiance; G. A. Garretson, Cleveland.

North Carolina.—It is said that the proposed extension of the Carolina Central division of the Seaboard Air Line which is being considered by that company, and mention of which we made March 28, will cost an enormous sum. The proposed route via Hickory Nut Gap, has been selected because it would involve less tunneling than any other though even by this route a great hole will have to be bored through the mountain. The new line will be only 42 miles, but the engineers who have been looking into the matter say that to properly grade a track even over that short distance in this rugged country would cost in the neighborhood of one million dollars for the road-bed alone. It is hoped to begin this construction during the coming summer and doubtless the system will perfect a scheme with Tennessee railroad interests so as to secure the advantages of a connection at Asheville, by having another road come to Asheville from that direction; indeed, such a scheme is already being developed at Knoksville, it is reported.

Pittsburgh, Marion & Chicago.—Messrs. A. F. Comstock of New York, C. W. Baringer, James W. Clark and N. B. Billingsby of Lisbon, are the purchasers of the Pittsburgh Marion & Chicago road together with its property of every description which was sold by the sheriff at Lisbon on April 13, for \$30,000, which price is two-thirds of the appraisement. The road now extends from New Galilee to Lisbon, Ohio, and it is proposed to build an extension to Wampum, Pa., where it will connect with the Pennsylvania lines, Pittsburgh & Lake Erie and Pittsburgh & Western. It is also proposed to build another link from Lisbon to Alliance and Congress Lake, where it would connect with the Cleveland, Canton & Southern and obtain an entrance to Cleveland.

St. Louis, Oklahoma & Texas.—The foreclosure sale of the St. Louis, Oklahoma & Texas road has been advertised for May 4 at Owensburg, Ky. This road is projected to run from Sapulpa, I. T., to Albany, Texas, 380 miles, via Tecumseh and Lexington, Okla., and Henrietta, Texas. This line has been surveyed from Sapulpa to Lexington, 110 miles, and 5 miles have been graded from Tecumseh, Okla., to the Chocktaw, Oklahoma & Gulf. It is expected to complete 20 miles of grade at once and to let contracts for the rest of the line from Sapulpa to Lexington in six months. The upset price for parcel one, including the property covered by the mortgages of Feb. 1, 1887, and May 24, 1889, is \$250,000, and for parcel two, including the property covered by the mortgage of 1892 but not by the earlier deeds, is \$50,000, the upset price for the whole being \$300,000, and the deposit of cash required at time of sale \$60,000. Mr. John E. Portis is secretary and treasurer and Mr. D. T. McDonough is chief engineer, both of Tecumseh, Okla., at which place the general offices are located.

San Francisco & San Joaquin Valley.—The San Francisco Bulletin of April 11 says: "More than a mile of track is being laid each day on the Valley R., and the track-layers will cross the Tuolumne river in a few days. In less than two weeks, at the present rate of progress, more than 60 miles will have been laid. There are now about 750 cars on hand."

San Antonio & Gulf Shore.—The San Antonio & Gulf Shore road, which is projected to run from San Antonio to the Gulf coast and which is already built and in operation for 29 miles, has been in chancery for some time. It was on April 11 ordered by the court to be sold July 7 for not less than \$150,000.

Seattle, Lake Shore & Eastern.—Judge Hanford of the federal court at Seattle, Wash., on March 31 ordered the sale of this road under foreclosure at Seattle on May 16 next. It is said there will probably be three bidders—the Canadian Pacific, the Northern Pacific and the bondholders who are foreclosing. The Canadian Pacific wants the west end of the road in order to retain its connection with Seattle. The Northern Pacific owns most of the capital stock of the company and wants to protect its interests. The bondholders believe that the property is going to become valuable and want to reorganize and rehabilitate it. All but about \$70,000 of the bonds have been deposited under the plan. The time for deposits expired April 15.

South Carolina & Georgia.—According to information purporting to come from Mr. L. A. Emerson, traffic manager of the South Carolina & Georgia, that road is about to inaugurate a line of steamers between Charleston, S. C., and Europe. The road has recently purchased valuable terminals on the Copper river water prong, and these are to be greatly improved. Mr. Emerson is also credited with saying that this company will begin at once to convert large buildings on the terminals into a grain elevator, with a capacity of 250,000 bushels, and that it will engage in the exportation, through Charleston this fall, of wheat and corn. It is expected that the first ship of the new Trans-Atlantic line, which is to be called "The Charleston," will be at the docks by September 1, ready to receive her cargo.

Southern—Knoxville, Cumberland Gap & Louisville.—It has been officially announced that the Southern Railway Co. has bought, and will at once take possession of, the Knoxville, Cumberland Gap & Louisville R., which extends from Knoxville to Cumberland Gap, Tenn., a distance of about 65 miles, and it is also unofficially stated that it has sold the Cumberland Gap tunnel and connections to Middlesborough, Ky., to the Louisville & Nashville R. Co. reserving trackage rights through and over the same. It will thus obtain access to the important coal, iron and other industries of the Middlesborough region, and establish a junction for the exchange of business at that point with the Louisville & Nashville R. Co. The latter company has bought the Middlesborough Belt Railroad, which together with the Cumberland Gap tunnel and that portion of the Knoxville, Cumberland Gap & Louisville R. which now forms the connection between the tunnel and the city of Middlesborough, will be added to its main line. Whether the Knoxville, Cumberland Gap & Louisville will be operated as an independent property or merged into the Southern Railway is not yet decided.

Southwestern, Arkansas & Indian Territory.—Mr. J. A. Woodson, receiver of this road, was on April 14, authorized by Judge Williams of the circuit court, to extend the line from its present terminus at Antoine to Pike City, a distance of 12 miles. To meet this expense, receivers' certificates, not to exceed \$20,000, bearing interest at 8 per cent per annum, will be issued, the same to be a lien on the road. The receiver was also directed to sell at public outcry and in lots the corporation lands included in the townsite of Pike City. July 14 has been named as the day for the sale.

Washington County.—The contract for building the Eastport branch of this road has been awarded to Messrs. Mitchell & Westcott, of Portland, Me., at \$18,000 per mile. This road when completed will be 115 miles in length, including the Eastport branch, and will run from a point in the city of Calais through Robbinstown and Perry into Eastport, and from Perry through Pembroke, Machias, Columbia, Steuben and various other places in Washington county. The entire line has been surveyed, and eight miles have been graded from East Machias west to Whitemeyville. It is said that Washington county has subscribed for \$500,000 of the preferred stock of the company.

NEW ROADS AND PROJECTS.

Arizona.—The Saluda Southern R. Co., which was incorporated at Phoenix, Ariz., on March 20, intends to build a system of roads through the property of the Rio Verde Canal Co. in North Arizona, comprising about 200,000 acres of land in Salt River Valley, and touching all the principal points in the territory. The main line will follow Gila valley, running thence to the White Tanks mountains, above Buckeye, into the Verde valley, and north to an outlet on the Magellan plateau, through Beaver creek canon. One of the lines will run from Yuma to Flagstaff, 335 miles. Then, from a point 19 miles north of Phoenix will radiate branch lines to Parker, on the Colorado river, 140 miles, and another line to Nogales, 19 miles. Local lines will

touch Glendale, Phoenix, Tempe and Mesa. This company for some years past has been building important irrigating canals through this region and a great deal of the land is already under cultivation. The incorporators are P. P. Parker, Frank L. Conkey, S. C. Symonds, J. A. Walton, Charles Missin and J. K. Doolittle. Capital stock, \$19,755,000.

Mississippi.—A new road was organized at Burnsville, Miss., on April 10, under the name of Burnsville & Alabama R. Co. The proposed railroad will be built in a south-easterly direction from Burnsville through a vast belt of very fine pine timber, and will penetrate some of the Western Alabama coal fields. Grading is expected to commence in thirty days. The directors are J. W. Jordon, Bunkie, La.; M. O. Elledge, G. W. Hutton, G. W. Phillips, S. J. Smith, T. T. Smith and J. A. Harrison, of Burnsville. The officers of the company are as follows: W. C. Fitzgerald, of Bunkie, La., president and general manager; A. P. Taliaferro, also of Bunkie, La., secretary and treasurer, and W. H. Phelps, of Burnsville, vice president.

Missouri.—On April 10, a charter was granted to the Mineral Belt R. Co., by the secretary of state at Jefferson City, Mo. It is proposed to construct a line of standard gage railroad from Webb City through Carterville, in Jasper county, to Granby, in Newton county, a distance of 25 miles. The stockholders are: J. H. Emmert, W. E. Dunn, S. T. Fulton, J. S. Ford, I. P. Dana, all residents of Kansas City. Capital stock, \$250,000.

North Carolina.—A company has been organized under the name of Thermal City & Panther Gap, to build a line between the two places named in the title. The line is to be narrow gage and surveys have been completed and the work of grading has commenced. It is said that the intention is to extend the road to Montford's Cove—about nine miles—as soon as the present construction is in operation. One or two locomotives and accompanying rolling stock will be purchased and the line put in operation by fall.

Ohio.—It is reported that the Brice syndicate has secured an outlet to Lake Erie for its lines. It is said that representatives of the syndicate have been quietly at work along the line surveyed a few years ago by other parties for a track from Phalaix, west of Leavittsburg, to Fairport. With a line built along this route to connect with Brice's proposed road from Akron to New Castle and Pittsburgh, the system would have a lake trade feeder of great value.

Pennsylvania.—At Harrisburg, Pa., on April 9, a charter was granted to the Butler & Pittsburgh R. Co., which is projected to build a line 42 miles in length to connect the Pittsburgh, Shenango & Lake Erie from its present terminus at Butler, with the Union R. Co., owned by the Carnegie Steel Co., which will thus secure a direct route for its ore and coal shipments between Pittsburgh and Lake Erie. The capital stock of the new incorporation is \$5,000,000. The long talked of extension of the Pittsburgh, Shenango & Lake Erie into Pittsburgh is thus materialized, and the road is assured of an enormous tonnage by a 25 year contract which the board of directors of the Pittsburgh, Shenango & Lake Erie have authorized to be made with the Carnegie Company, to handle their raw and finished material. It is said to be the intention later on to form a new company, to be called the Lake Erie & Pittsburgh, which will be a consolidation of the Pittsburgh, Shenango & Lake Erie and the Butler & Pittsburgh. This company will have a capitalization of \$10,000,000 each in stock and bonds. Of the bonds \$4,800,000 will be used to cover the cost of the extension from Butler to the connection with the Union R. Co., and for improvements on the old line, additional docks, etc., at Conneaut. There will be left a balance of \$1,200,000 in the company's treasury for future requirements. The officers of the new company are as follows: President, John Dick, Meadville; secretary, N. C. McLaughlin, Meadville; treasurer, A. B. Westervelt, New York. The directors are: John Dick, W. S. Rose, J. G. Foster, W. K. Richards, N. C. McLaughlin, and W. G. Sargent, Meadville; J. T. Blair, Greenville, Pa.

Texas.—On April 11 the charter for the Dallas & Southeastern R. Co., was filed with the attorney general for approval. The object of the new corporation is to purchase and extend the Texas Trunk-railroad running from Dallas to Cedars, in Kaufman county, and which was recently purchased at a receiver's by Mr. E. R. Pardee of New York. Mr. Pardee is the principal stockholder in the new company, the others being Dallas and McKinnley people.

The inhabitants of Crawford, McLennan county, Texas, are contemplating the building of a line from that town to Waco a distance of 20 miles. Crawford is situated on the Gulf, Colorado & Santa Fe, and in order to reach Waco it is necessary to go first to McGregor and take the Cotton Belt or go to Morgan and take the Texas Central, in either case making a long detour and paying much unnecessary mileage, besides the loss of time. Mr. J. B. Nichols, one of the leading men of Crawford thinks the Gulf, Colorado & Santa Fe would build a Waco branch if the citizens most interested would get the right of way and grounds for depots at Waco, Crawford and intermediate points. The track from Waco to Crawford would be built upon an easy grade, much of the way on hard ridge land between the Bosques. The work of getting up donations will begin, and when the papers are ready they will be sent to the Gulf, Colorado & Santa Fe managers.

Wisconsin.—At a recent mass meeting held at Cumberland, Wis., a committee was appointed to consider the project of a Cumberland connection with the Soo Line. This committee met on April 9 and decided to recommend the corporation of an independent company to build an air line road from Cedar Falls to Superior, 120 miles. This would form a connection with the Milwaukee at Cedar Falls, with the Wisconsin Central at Warner, with the Soo at spur 6 and with the Omaha at Cumberland. Thence it will penetrate the pine forests of Burnett and Douglass counties, and form important railroad and lake-connectons at Superior. The proposed line would follow the Hay river valley from Cedar Falls to Cumberland, passing through one of the richest agricultural districts in the state. It is proposed to complete the proposed road from spur 6 on the Soo, eight miles, the coming season.

INDUSTRIAL NOTES.

Cars and Locomotives.

The Chicago & Northwestern is reported as having placed an order for 150 furniture cars with the Haskell & Barker Car Co. during the present week.

Notice should have been made in our issue of last week of the letting of 1,000 box cars by the Lehigh Valley road to the Michigan-Peninsular Car Co. These are the cars mentioned in our issue of March 14 as to be let.

The Baltimore & Ohio repair shops have put in shape within a few months nearly 200 locomotives that six months ago were said to be useless; about 15,000 freight cars and 160 coaches have also been repaired, many of them having been rebuilt.

The Pittsburgh Locomotive & Car Works has received an order from the Seaboard Air Line for 12 engines, also 24 mogul engines for the Vandalia lines.

The Baltimore & Southern Railroad Co. is inquiring for six engines, twelve passenger cars, thirty box and gondola freight cars, sixteen freight and passenger stations, platforms, rails, fish-plates, etc.; Frank R. Biedler, president, Baltimore, Md.

The buildings of the new car wheel works in Birmingham, Ala., cover a block of ground, and will employ nearly 100 men. Orders for wheels have already been booked.

The so-called single driver locomotive which was turned out in August last by the Baldwin Locomotive Works for the Philadelphia & Reading Railroad has given such satisfaction in operation and has met the requirements for which it was built to such a degree as to lead to the order of another engine of the same type, which has been running on the road for about five weeks, and to all appearances is giving equally good service. It will be remembered that this engine is of the Vauclain four cylinder type with cylinders 13 and 22 x 26 in. and with piston valves. The engine was illustrated and described in the RAILWAY REVIEW, of August 3, 1895.

Buildings.

The Fleming Boiler Works at New Castle, Pa., will shortly begin the erection of a large brick and iron boiler shop. They will vacate their old wooden building in order that the Elliott-Washington Cold Rolled Steel Works may enlarge their rapidly growing plant. The latter firm will then have perhaps the largest plant in America devoted to the manufacture of cold rolled steel.

The Strange Forged Twist Drill Co. of New Bedford, Mass., has decided to erect a new plant. The main structure will be 40x130 ft., two stories high, with forging room and boiler house. The forging room will be 42x60 ft., one story high, and the boiler house 31x53 ft., one story high.

The Baltimore & Southern Railroad Co. will expend about \$75,000 in the construction of docks, wharves, two machine shops, etc., at Drum Point. Frank R. Biedler of Baltimore, president.

A new repairing department is to be constructed at the Cincinnati Southern shops in Chattanooga, at once.

Baker & Shevlin, foundrymen and machinists of Saratoga Springs, N. Y., have begun preparations for a large addition to their plant, which is at present one of the most extensive in Northern New York. For some time their foundry has been inadequate to the demand and an addition is to be made which will nearly treble the present foundry capacity. Part of the new addition will be equipped as a brass foundry and five new brass furnaces will be erected, as the concern's brass work has increased greatly of late and demands more facilities. With the new machinery a brass casts of 5,000 lbs can be made. It is the firm's intention to later put in a new cupola. It is expected that the improvements will be completed in about thirty days.

Subscriptions are being secured for the construction of the proposed car shops at this place for the Buffalo, Rochester & Pittsburgh R. Co. There are to be eight buildings, the largest of which will be 215x60 ft. Address G. A. Lozier, M. D. Wyman or D. L. Corbett of Du Bois.

Bridges.

Plans for an approach to the Belle Isle bridge, Detroit, Mich., to cost about \$52,000 have been prepared by Mr. D. A. Hitchcock.

It is stated that the promoters of the Nepean Point Inter-provincial bridge will begin the construction of the structure at once if the government will appropriate \$250,000. Estimated cost of the bridge is placed at \$750,000.

The two bridges near Gates City, Va., on the South Atlantic & Ohio R. which were destroyed by the recent floods will be rebuilt at once by the company. It is also stated that the town authorities of Gate City will replace the bridge at Taylor's Mill, destroyed at the same time.

Falmouth, Mass., has been authorized by the legislature to appropriate money for two bridges.

It is reported that plans for the West Genesee hoist bridge Syracuse, N. Y., have been submitted to the counsel by C. W. Adams, state engineer, Albany, and if the plans are approved bids will be asked for the construction at once.

It is stated that new bids will be asked for the construction of the Porter Ave. bridge over the Erie canal Buffalo, New York, by Geo. W. Aldridge, superintendent state public works, Albany. The bids submitted on the former tender were rejected on account of being too high. The Buffalo Dredging Co. was the lowest bidder for the substructure at \$19,497, and the Buffalo Bridge & Iron Works was the lowest for the superstructure at \$51,500.

Sealed proposals will be received until May 6 for the construction of a bridge complete over Beachtree creek, after plans and specifications by Grant Wilkins, engineer. Address for particulars, Anton L. Kontz, clerk to commissioner of roads and revenues, Atlanta, Ga.

David M. Wise, county engineer, Youngstown, O. states that two bridges to be built over the Mahoning river, Youngstown, O. and a railway bridge over a street are awaiting the action of the legislature.

A bridge between San Francisco and Oakland, Cal., is proposed by Mr. Lyman Bridges. It would be 17,900 ft. long, with two draw spans of 250 ft. each.

Iron and Steel.

It is stated that contemplated extensions in the Carnegie Steel Co.'s Pittsburgh plants will, when completed, make that company much the largest producer of open hearth steel in the world. A part of the extension is said to consist of doubling the capacity of the open hearth department.

The Ohio Steel Co., at Youngstown, Ohio, last week posted notices in its plant that it would resume operations in full on April 13.

The stockholders of the Lorain Foundry Co., at Lorain, Ohio, have voted to increase the capital stock of that company from \$40,000 to \$100,000. It is proposed to issue only \$60,000 of this amount at the present time, all of which has been subscribed. Ground has been broken for the new foundry, and contracts have been placed for the building.

The Niagara Paper Co., Niagara Falls, N. Y., has awarded the contract for furnishing the shafting required in its new construction to the Eastern Forge Company of Massachusetts, Boston, Mass. The contract aggregates 75 tons of shafting completely finished. Nearly all of the principal forges of the country were bidders.

The Edgar Thomson Steel Works, Braddock, Pa., is stated to have completed the order for 10,000 tons of rails for the Japanese government. They will be shipped from Baltimore to Tokio via Cape Horn.

The Central Iron Works, Harrisburg, Pa., has received several heavy orders for plate for bridge work. The firm is now completing a contract for iron plates for two ferry boats for Delaware river work now in course of construction at Chester, Pa.

The Chattanooga (Tenn.) Foundry & Pipe Works has purchased the property formerly occupied by the South Tredegar Iron Works. It is a splendid manufacturing site and will be especially valuable for manufacturing purposes. The firm is now using leased grounds and is cramped for want of space, and although nothing is as yet decided it is possible that they will build on the property.

A peculiar contract for 2,200 tons of steel beams and girders was recently awarded to the Pacific Rolling Mill Co., of San Francisco, to be furnished for the new building of the San Francisco Call. The building will be nineteen stories high, and will be the largest steel building on the coast. The contract for the structural steel is not only said to be the largest thus far let on the Pacific coast but it is peculiar in its limitations to the capacities of the home rolling mills. The architects were instructed by Claus Spreckels, the owner of the building, to design the shapes of the beams and girders so that the home mill would be able to furnish them. It is customary to force a mill to comply with the designs of an architect or engineer, but it is stated to be in accordance with Mr. Spreckels' policy of patronizing home industries.

It is stated that the Mannesmann Tube Co., which has six large factories in Europe, has leased the old Zylonite (Mass.) plant and has begun to remodel the buildings. The company will build a dam on the Hoosac River and most of the machinery will be run by water power. The company is composed of New York, Boston, Springfield and Berkshire capitalists, and will employ 600 skilled workers.

The Universal Construction Co., whose principal place of business will be in Campbell county, Ky., has filed incorporation articles. It has \$50,000 capital, and will engage in the manufacture and sale of iron and steel, structural material, bridges, etc. The incorporators are: M. J. Brown, J. P. Miller and Wm. E. Bush. Robt. W. Hunt and W. R. Stirling, of Chicago, are among the stockholders.

Machinery and Tools.

The Pittsburgh Feed Water Heater & Engineering Co. has been mutually dissolved, arrangements having been completed with the Ohio Machine Co., of Middleport, O., to carry on the manufacture of the Pittsburgh heater. The company will be represented in Pittsburgh by J. E. Schlieper, who will act as general sales agent. The new company is composed of J. S. Boggess, president and treasurer, L. R. Haag, secretary, and J. E. Schlieper, chief engineer. An order for 900 horse power has been received from the American Reduction Co., of Pittsburg, to be installed in this plant on Second avenue.

The Mount Carbon Co., Limited, Powellton, W. Va., are figuring on a system of air haulage for its mines, including locomotives, air compressors, engine, boiler, etc.

The Weimer Machine Works Co., of Lebanon, Pa., has just completed testing in their works under steam the 42-inch diameter Weimer-Corliss steam cylinder, 84-inch diameter Weimer air cylinder 60-inch blowing engine they have built for the Ashland Coal, Iron & Railway Co., of Ashland, Ky. The test was very satisfactory to the purchasers, and is now being taken down and loaded and in a short time will be doing duty on the furnace. This engine is built extra heavy, for hard and long duty. The shipping weight will be 270,000 lbs.

The Harrisburg Foundry & Machine Co., of Harrisburg, Pa., has recently made a shipment of two 300 horse power engines to Italy. Two others are in process of construction for an electrical plant at Braintree, Mass.

One of the largest pieces of machinery ever handled by the Westinghouse Machine Co. was shipped a few days ago. It was a single piece casting weighing 40,000 lbs.

The "Windy Boiler Maker," as the pneumatic hammer of the Chicago Pneumatic Tool Co. has been dubbed, is drumming up a great reputation for itself, but then it is a Chicago production, and the reputation of this city as the fountain head of wind and noise must be maintained. Any who have doubts as to whether this is being done should visit a shop where a few of these tools are at work. Three of them have recently been installed in the Chicago, Milwaukee & St. Paul shops at West Milwaukee.

Miscellaneous.

The Harlin Car Coupling Co., of Stockton, has been incorporated with a capital of \$250,000. The following gentlemen are named as stockholders: J. J. Scrivner, Jacob Simon, O. B. Parkinson, George C. Harlin, Alexander Dinsmore, J. A. Nadeau, Joseph Reine.

The American Railroad Equipment Co., of East St. Louis, has taken out letters of incorporation papers with a stated capital of \$2,500.

Fairbanks, Morse & Co., report their business as very good and prospects for the future as exceedingly flattering. The Chicago headquarters are about to be moved to a more pleasant and commodious building. The Beloit shops are being enlarged in some departments as with the present facilities it has been impossible to keep up to the orders.

Notice is given that the annual meeting of stockholders of the United States Car Co., will be held at the office of the company in the Corporation Trust Building, corner Grand and Greene streets, Jersey City, New Jersey, on Monday, May 4, 1896, at 11 o'clock a. m. for the election of directors and the transaction of such other business as may come before the stockholders for action.

The Safety Car Heating & Lighting Co., of New York, is enjoying an excellent business. There are now 8,614 cars in the United States using the Pintsch light, and the number is constantly growing. Of these 354 are railway mail cars, no doubt to the gratification of the long suffering postal clerks, who should have had better lights long ago. People now-a-days will not put up with poorly lighted cars and the Pintsch light will soon be in general use.

The Pennsylvania Railroad Co. is reported as having contracted with the William Cramp & Sons' Ship and Engine Building Co. and the Charles Hillman Ship & Engine Building Co. of Philadelphia for the construction of two ferry boats which will ply between the railroad terminal in Jersey City and Twenty-third street, New York. The boats will each be 208 ft. in length and 65 ft. beam, and will be propelled by screws—two at each end. The establishment of a service whereby passengers can be landed further up town than at present in New York has been contemplated for some time by the Pennsylvania Railroad officials, and when the new boats shall be completed the arrangement will be put into effect.

Mr. Edgar C. Seebom, the representative sent to South Africa by J. A. Fay & Egan Co., of Cincinnati, O., manufacturers of woodworking machinery had a close call recently at Johannesburg, where he was sent to install some machinery for his company, and as a consequence writes to suggest that a change be made in the pattern of the column of his company's band mill, as he had difficulty in getting it through the custom house, the Boers taking it for a large cannon or some sort of a machine gun and wanting to confiscate it. Mr. Seebom says that it took any amount of talking to convince them that it was a part of a band mill and are even now a little skeptical as to its being what he claims, and ride past every hour or so to watch the progress made in its erection. He is afraid they may yet make up their minds it is some kind of a weapon of war and take it and him with it, as they wanted to run him in for blowing his whistle, and did in fact run in the whistle. He experiences great difficulty in procuring the necessary labor to erect the mill, as the Kaffirs have all left for their homes in expectancy of war, the indication being that the whole of South Africa will form a combination against the English.

On the last day of March the New York Belting & Packing Co., 15 Park Row, New York, shipped 33 miles of hose from their Passaic, N. J., factory alone.

The Chicago Belting Co. has under construction what will be, it is said, when finished the largest belt in the world. It is being made for the Louisiana Electric Light Plant of New Orleans, and will be 150 ft. long, 84 in. wide, three-ply, with a total weight of one and one-half tons.

The Smith Safety Coupler Co., of Memphis, Tenn., has been incorporated with the following named gentlemen as incorporators: Charles H. Smith, of Birmingham, Ala.; Rolla Wells of St. Louis; S. W. Kenward, of Pine Bluff, Ark.; P. H. Murphy of East St. Louis, Ill., and M. R. Galbraith, of Pine Bluff, Ark.

It is proposed to organize the Norfolk Docking, Shipbuilding & Machine Co., with a capital stock of \$500,000, for the purpose of erecting and constructing an off-shore floating dock of steel and marine repair plant to work in connection therewith. Plans and estimates have been prepared. Address J. P. Andre Mottu, Norfolk, Va.

A dispatch from Berlin reports that a syndicate of Pennsylvania coal operators has made a successful experiment in shipping anthracite coal to Germany, and that a larger movement in this direction is looked for in the near future. Pennsylvania operators have for some time been making endeavors to enter the German market, but have so far met with the usual indisposition of the people of that country to make changes in their methods. It is thought now, however, that there is a practicable opening for a large supply of anthracite coal to be marketed in Germany and other European countries.

It is reported that the railway shops of the B. & O. S. W. Railroad at Wabash, Ind., have closed down indefinitely.

A circular has been issued to the stockholders of the Westinghouse Electric & Manufacturing Co. of Pittsburgh, calling for a special meeting to be held at that city on June 4 to vote on the proposition to increase the capital stock from \$19,000,000 to \$15,000,000. The object of the increase is to pay off the floating debt of \$3,000,000 and to prepare for an increase of business. The circular calls attention to the advantageous agreement for interchange of patents with the General Electric Co., and states that it will increase the profits of the company. Of the \$10,000,000 authorized capital about \$9,000,000 has been issued. All of the new stock is to be of the same character as the present assenting stock, and the balance of stock which will remain after the delivery of the \$3,000,000 of stock sold, is to be issued from time to time by the directors of the company's business.

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